CLINITEK Advantus™
Analyzer

Clinitek Advantus Analyzer

Service Guide

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Bayer HealthCare

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General Description

The Clinitek Advantus™ Urine Chemistry analyzer is a stand-alone, semi-automated urine chemistry analyzer. It is a scanning reflectance photometer capable of producing clinically significant diagnostic results when used with a variety of Bayer HealthCare reagent strips.

The Clinitek Advantus analyzer is capable of processing in excess of 500 urine chemistry reagent test strips per hour. This system is an upgrade replacement system for the Clinitek® 500 Urine Chemistry Analyzer and adds a color-enhanced touchscreen monitor and enhanced LIS connectivity.

Features

The following features on the Clinitek Advantus Analyzer can reduce the time spent on processing urine samples:

- color touchscreen display
- alternative strip – allows operators to test with 2 different strip configurations
- ability to perform STAT tests
- ability to accept load lists from the LIS
- ability to enter load list from an optional keyboard
- ability to enter microscopic data and stores the data with the patient record
- optional automatic urine color determination
- confirmatory sieve with batch results editing to eliminate mainframe editing
- memory recall to allow operators to display the test results from specific samples
- optional barcode reader support to allow operators to enter color, clarity, and patient ID
- internal automatic calibration that improves the reliability of results
- no warmup time before starting a batch
- user interface available in English, German, French, Italian, Spanish, Portuguese, Swedish, Chinese (simplified), and Japanese, with applicable help screens

For more information about the Clinitek Advantus analyzer, refer to the *Clinitek Advantus Operator's Guide, Section 1, Overview.*

System Overview

The analyzer has several sub-systems:

- user interface
- readhead system
- reagent transport
- data processing

Within each of these sub-systems are specific electrical, mechanical, and software components. Two independent processors control the operation of the analyzer:

- processor 1 manages data I/O and the user interface
- processor 2 controls basic analyzer hardware functions

User Interface

Processor 1 controls all user interface functions. The user interface consists of the following components:

- a touchscreen display
- audible and visual alarms
- internal and external printer options
- PS/2 input for barcoded sample ID and keyboard
- 9-pin serial RS232 data port for interface with an external customer information system (computer)

- Ethernet RJ45 port for interfacing to an external customer information system.

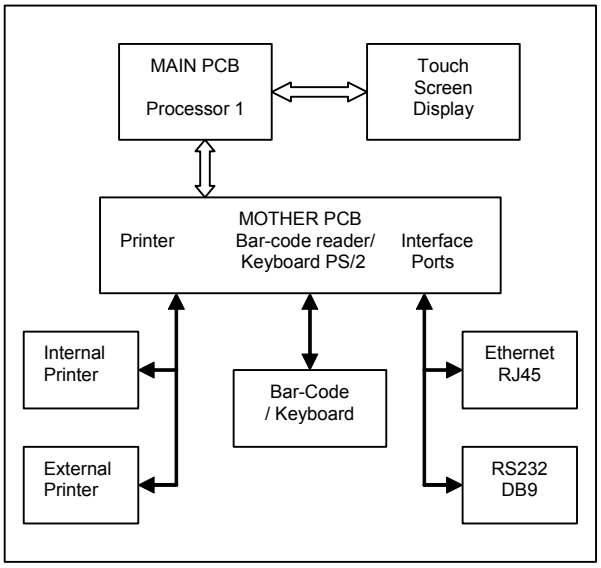


Figure 1-1 User Interface Block Diagram

Power Distribution

The AC line input for the analyzer first passes through the power entry module, consisting of a line cord receptacle. A separate On/Off switch is mounted along the left side of the analyzer.

The power supply is a switching power supply. The AC input voltage is automatically compensated for and has a range of 90 – 264 VAC, 50 – 60 Hz. There is a 2.5 Amp fuse is on the AC line on the power supply. This supply has the following outputs:

- +5 VDC and +12 VDC
- -12 VDC and -5 VDC

You can adjust the exact voltage level of the +5 VDC output using potentiometer VR1 adjacent to terminal block J10. Refer to *Adjusting the Power Supply Output Voltage*, page 4-2.

Fold-back current protection and an internal fuse protects the power supply from overload. An internal over-temperature protection circuit with automatic reset provides additional protection. Output noise and ripple is less than 0.3% RMS (noise) and 1% peak-to-peak (ripple) for the main +5 VDC output.

The MOTHER PCB distributes the power throughout the analyzer. A cable connects the power supply to connector PL15 of the MOTHER PCB. Connector PL15 is a 6 pin connector and has the following pin out:

Pin 1	– 12 VDC
Pins 2 and 3	DC ground
Pins 4 and 5	+ 5 VDC
Pin 6	+ 12 VDC

An auto reset fuse (F1) is soldered on the MAIN PCB on the +3.3 VDC line for the SD Card connector. The 2 auto reset fuses, F1 and F2, on the MOTHER PCB are tied to manufacturing test points and are not customer related.

Connector PL6 on the MOTHER PCB powers the internal printer, as follows:

Pins 1 and 2	+ 5 VDC
Pin 3	DC ground

The strip detector circuit operates off both +12 VDC and –12 VDC. This power is supplied through connector PL9 of the MOTHER PCB as follows:

Pins 1, 4, and 5	GND
Pin 3	+12 VDC
Pin 2	– 12 VDC

MOTHER PCB

The MOTHER PCB serves as an interconnection board for many of the system's I/O functions and contains a portion of the analyzer's control circuitry. The MOTHER PCB is not designed for the replacement of parts at the component level and Global Service and Support will not support it.

Processor 2 is located on the MOTHER PCB. Processor 2 (U13) is a surface-mounted Atmel AT89C51ED2, 8051 series, and is tied to an FPGA (U1), which does all of the I/O functions.

Processor 2 is used to control the following functions:

- moving the strip, including the strip detector, push bar motor, moving table motor
- moving the readhead
- checking for errors
- reading the strip
- performing calculations on strip data
- storing one set of results: reflectance, decodes, and color
- maintaining real time and date

Processor 2 system software is stored in U17, 256K SRAM device.

Data for the internal printer is sent from processor 1 through processor 2 and then through U4, octal buffer/line driver, to PL3.

ICs U6, U7, U11 and U12 are quad comparators used in conjunction with U1 FPGA and Processor 2 for the strip detector control.

U22 is an NVRAM supervisor device used to protect the SRAM from memory corruption and provide battery backup for the SRAM using a Lithium half-AA size battery.

You can use the Reset button, PB1, on the MOTHER PCB to reset the program memory.

Connection to the MAIN PCB, Processor 1, is done through a 50 pin connector, PL13.

Motor Drive Circuits

The drive circuits for the moving table, push bar and readhead all utilize the same circuit design. U25, U5, and U2 are motor controller ICs that convert the instructions from Processor 2 to drive signals for the stepper motors.

The input signals are Step (pin 10), Enable (pin 15), and Direction (pin 11). The half step control line is tied high to the +3.3 VDC, thus disabling this function on all ICs. Pin 22 is tied to the system reset.

The output of the motor controller IC drives a 4-phase stepper motor. The outputs are as follows:

Pin 12	A output
Pin 4	B output
Pin 21	C output
Pin 9	D output

Each of the outputs is clamped to ground through reversed bias schottky diodes, D1-D12.

The stepper motors are 4-phase and have typical coil resistances as follows:

- readhead motor, 24 ohm
- push bar motor, 53 ohm
- moving table motor, 32 ohm

Optical Sensors

The system has the following optical sensors:

- fixed platform is in place sensor
- push bar interrupt sensor

- moving table interrupt sensor

All of the sensor outputs are routed to the MOTHER PCB Processor 2. The following tables list the parameters of each optical sensor:

Table 1-1 Optical Sensors

"Fixed Platform is in Place" Optical Sensor	
PN	40453222
Location	on the support of the fixed platform guide
Use	determines if the fixed platform is fully seated
Connection	connector PL8 on the MOTHER PCB
Error state	a general system Error 26 occurs and halts operation
"Push Bar Interrupter" Optical Sensor	
PN	40453233
Location	on the metal support bracket for the stepper motors, at the right end of the upper Pusher Bar shaft
Use	determines if the push bar cycled completely
Connection	connector PL12 on the MOTHER PCB
Error state	a general system Error 24 occurs and halts operation
"Moving Table Interrupter" Optical Sensor	
PN	40453221
Location	on the left side of the right fixed platform guide
Use	determines if the strip transport is working properly When the system initiates a test cycle and activates those mechanisms used to advance a reagent test strip, it expects to see a signal change from this sensor within a certain time.
Connection	connector PL1 on the MOTHER PCB
Error state	a general system Error 23 occurs and halts operation

External Printer Interface

The external printer port SK2, is located on the MOTHER PCB. The analyzer passes data from the MAIN PCB, processor 1, connector PL13 to the MOTHER PCB, then on to the 25 pin female D-connector on the back of analyzer.

The logic interface is an 8-bit parallel data path along with a strobe to indicate when the printer samples the data.

The MOTHER PCB, processor 2, senses 2 status signals from the external printer:

- Paper end (PERROR)

- Busy

Table 1-2 External Printer Connector, Parallel 25 Pin (DB25)

Pin	Signal	Pin	Signal
1	Data Strobe L	14	AFXN L
2	Data 0	15	ERROR L
3	Data 1	16	INIT L
4	Data 2	17	PAR IN L
5	Data 3	18	Signal Ground
6	Data 4	19	
7	Data 5	20	
8	Data 6	21	
9	Data 7	22	
10	ACK L	23	
11	Busy	24	
12	PERROR	25	
13	Select L		

All signals should be at 5 V TTL levels:

Logic 1	>2.4 V @ +500 µA
Logic 0	< 0.8 V @ -2 mA

Serial Port

The MOTHER PCB also provides interconnection from the MAIN PCB (connector PL13) to the RS232 serial port PL19. The driver (U23) for this port is located on the MOTHER PCB. Connector PL19 is a 9-pin male D-Connector. This port allows for serial connectivity to an external computer or host. Settings are independent of those for the Ethernet.

Table 1-3 Serial Port Connector, RS232 9 Pin (DB9)

Pin	Signal	Pin	Signal
1	CD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI (not used)
5	Ground		

The serial port has the following default settings:

- 9600 Baud

- 8 bit characters
- No parity
- 1 stop bit

Use the Setup menu to access the following settings;

Baud	1200, 2400, 4800, 9600, 19200
	8-bit with No Parity
	7-bit with No Parity
	7-bit with Even Parity
	7-bit with Odd Parity

PS/2 Port

You can connect a PC keyboard with a PS/2 interface connector or a suitable barcode reader with a PC Wedge interface separately or jointly to the analyzer through the PS/2 (SK1) port on the back of the analyzer.

SK1 is a 6-pin PS/2 (6-pin mini DIN) female connector with the following pin out:

Pin 1	Data (bi-directional)
Pin 2	Not connected
Pin 3	Ground
Pin 4	+5 VDC
Pin 5	Clock (bi-directional)
Pin 6	Not connected
Screen	Ground

Keyboards must meet the standard QWERTY US layout.

Ethernet Port

A new feature of the Clinitek Advantus is the ability to connect to a hospital LIS through an Ethernet port, located on the back of the analyzer. A Lantronix XPORT 10/100mB Ethernet to RS232 port converter mounted on the MOTHER PCB (PL18) offers a 10/100 base T connection using TCP/IP protocols. The settings are independent of those for the RS232 port.

You can assign either a static IP address or a DHCP name through the set up menu under Network settings.

The serial port has the following default settings:

- 9600 Baud
- 8 bit characters
- No parity

- 1 stop bit

The following settings are available through the setup menu:

Baud	1200, 2400, 4800, 9600, 19200
	8-bit with No Parity
	7-bit with No Parity
	7-bit with Even Parity
	7-bit with Odd Parity

Table 1-4 Ethernet Port Connector Twisted pair, RJ45

Pin	Signal	Pin	Signal
1	TD+ (or tpe 0)	5	Common Mode Termination
2	TD- (or tpe 1)	6	RD- (or tpe 3)
3	RD+ (or tpe 2)	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

Moving Table

After the strip detector confirms the presence of the reagent strip, the moving table assembly moves the reagent test strip. A stepper motor, which is under the direct control of processor 2, drives this assembly.

Processor 2 sends control signals for direction and a pulse train to the stepper motor controller chip on the MOTHER PCB. The controller converts the pulse train into 4 outputs for the windings of the stepper motor, as follows:

- phase A
- phase B
- phase C
- phase D

The analyzer uses an optical interrupter detector to establish a home location for the moving table and the moving table provides a means of timing its operation to detect errors in its motion. Refer to *Motor Drive Circuits*, page 1-5.

MAIN PCB

The MAIN PCB, located behind the touchscreen, contains following components:

- processor 1
- Display / Touchscreen support
- MMC software card socket

Processor 1

Processor 1 (U7) is a surface-mounted Atmel AT89C51ED2 (8051 series) and is tied to an FPGA (U1) that does all of the I/O functions. These components perform the following processes:

Table 1-5 System Processors

Component	Processor Functions
Processor 1	used for the following actions: • serial communications • barcode communications • internal and external printer functions • converting decode values to clinical levels • providing all user interface functions This processor communicates with Processor 2 and includes the ability to program Processor 2.
MMC SD Card	used to update system software. The card does not have to remain in the system. Remove the card when you finish performing a software update. System software is stored internally.
IC U4	a 4MB, 90ns, FLASH memory device used to store the system programming software for Processor 1
IC U2	the system SRAM (512K), used to store patient results. An NVRAM supervisory device U22 located on the MOTHER PCB provides battery backup. U8 NVRAM and an ultra capacitor (CC1) provide short term power backup.
PB1	reset button, used to reset the program memory on the MAIN PCB
U19	printer buffer, where in conjunction with a response to a strobe signal data is sent out connector P1

Associated Display and Touchscreen Support

The Touchscreen is connected to the MAIN PCB at connector PL2. The LCD connection is provided through PL8 for control and PL7 for the backlight. The analyzer sends data from processor 1 to a latch U15 where it is then clocked to the display. Operators enter information from the touchscreen keyboard and it is passed through connector PL2 to processor 1. Connector PL8 pin 11 for the +5 VDC, pin10 for the GND, and pin 9 for VCLD 30V supplies power to the LCD display.

Touchscreen Display

The touchscreen display assembly consists of 4 main components:

- bezel assembly
- touchscreen
- LCD display
- MAIN PCB.

The display is a 5.7-inch 320 by 240 pixel passive matrix color LCD and is controlled by the Video RAM interface portion of the FPGA and U3 (video memory) on the MAIN PCB. U19 and U20 are octal buffer/line drivers also used in the LCD drive circuit. The system presents the information to the FPGA in an 8 bit parallel format from processor 1. It is then converted to a video format and sent to the display as pixels. The color display is based on 8 basic colors and variations on pixel intensity allows for 64 color palette.

The touchscreen is a 4-terminal resistive contact overlaid onto the LCD display and is supplied as a complete assembly. The FPGA on the MAIN PCB interprets the touchscreen.

MMC Program Card

The MMC program card slot is located on the right back corner of the display assembly. The card is used for software updates and does not have to be in the instrument during normal operations.

Readhead System Overview

The Readhead system consists of the following components:

- 2 Pre-AMPs
- A/D converter subsystem
- 2 lamps, independent illumination sources
- drive subsystem
- system controller

The analyzer uses 2 readheads that are spaced to allow for 2 readings of a strip. The first reading occurs approximately 25 seconds after the strip has been dipped and the second reading at about 67 seconds.

Each readhead consists of a light source and 4 detectors. The detectors each have an optical filter that passes a broad bandwidth of energy to the detector. The 4 bands passed to the detectors are as follows:

- Infrared (IR)
- Red
- Green
- Blue

The system passes the output of each detector to a 2-stage amplifier. Refer to *Pre-AMP PCB Theory*, page 1-15.

The 4 outputs—IR, Red, Green and Blue—from each of the 2 pre-amps PCBs are routed to a common A/D PCB. The A/D PCB contains an 8-channel A/D converter that is multiplexed to select which of the 8 channels are converted. Its output is sent in a serial format to Processor 2. Refer to *Pre-AMP A/D PCB Theory*, page 1-15.

Processor 2 controls the operations of reading the strips and calculating the results. After the system calculates the results, they are sent to processor 1, which controls the User Interface.

Readhead Movement

A stepper motor drives the 2 readheads on the analyzer. The readheads are mounted to a readhead carrier that rides on a precision ball slide. The process of taking a reading involves moving this assembly over and scanning each reagent strip, taking one or more readings at every pad location. Processor 2 controls the position of the readhead carrier. Refer to *Motor Drive Circuits*, page 1-5.

Reading a Strip – Process Summary

The scan cycle is 7 seconds.

1. The strip detector verifies strip presence.
2. Processor 2 activates the moving table to advance the reagent strip into the readhead area.

   It takes 3 cycles for a reagent strip that was placed on the load area to move under readhead 1.
3. If a strip was under readhead 1 during the previous scan cycle, a control code is sent to processor 2.

   The analyzer verifies a strip is present at readhead 1 by using the IR reflectance between pads 9 and 10, and Pads 2 and 3. The IR reflectance must be greater than 65%.
4. If a strip was present at readhead 2 during the last cycle, the data set, which includes the error code, is sent to processor 1.

   The analyzer resets the error flags after it sends the error code.

   NOTE: If both events 3 and 4 occur, an error code is sent first.
5. At 3.0 seconds into the 7-second scan cycle, the system begins the actual read operation:
   a. The analyzer moves the readheads to find the edge of the cal chip under readhead 1 and moves to the center of the cal chip.

      This is arbitrarily set as location 0.
   b. The analyzer performs a dark value reading on all channels.

c. The analyzer turns the lamps on and performs a calibration of all channels on the white cal chip.

d. The analyzer moves the readheads out 0.017” and reads each of the 8 channels.

   These readings consist of the A/D converter values associated with each channel.

e. The analyzer stores all of the readings in temporary memory in the order taken.

f. The system repeats this until it completes 1488 readings of 2 bytes each, subtracts dark values from the reads, and stores the resultant values for each readhead during the scan cycle.

g. The readheads return to the cal chip location.

6. The system performs calculations based on the specifics of the reagent strip being tested.

   - The system does not use all data in these calculations.

   For example, for most MULTISTIX reagents, the system uses only the reading closest to the center of the reagent pad in the determination of results for that analyte.

   - The system performs calculations to obtain reflectances, which, after processing in the specific algorithm for a reagent, it compares to a decode point, and converts into a reportable clinical level.

   The system stores each of the interim and final results in the appropriate data set.

7. After the system completes all individual pad calculations, it performs and stores the color calculations.

8. The system sends the date, time and sequence number in the data set and then increments the sequence number.

9. The system then waits until it completes the 7-second scan cycle.

   The process repeats until no more reagent strips are under the hood area.

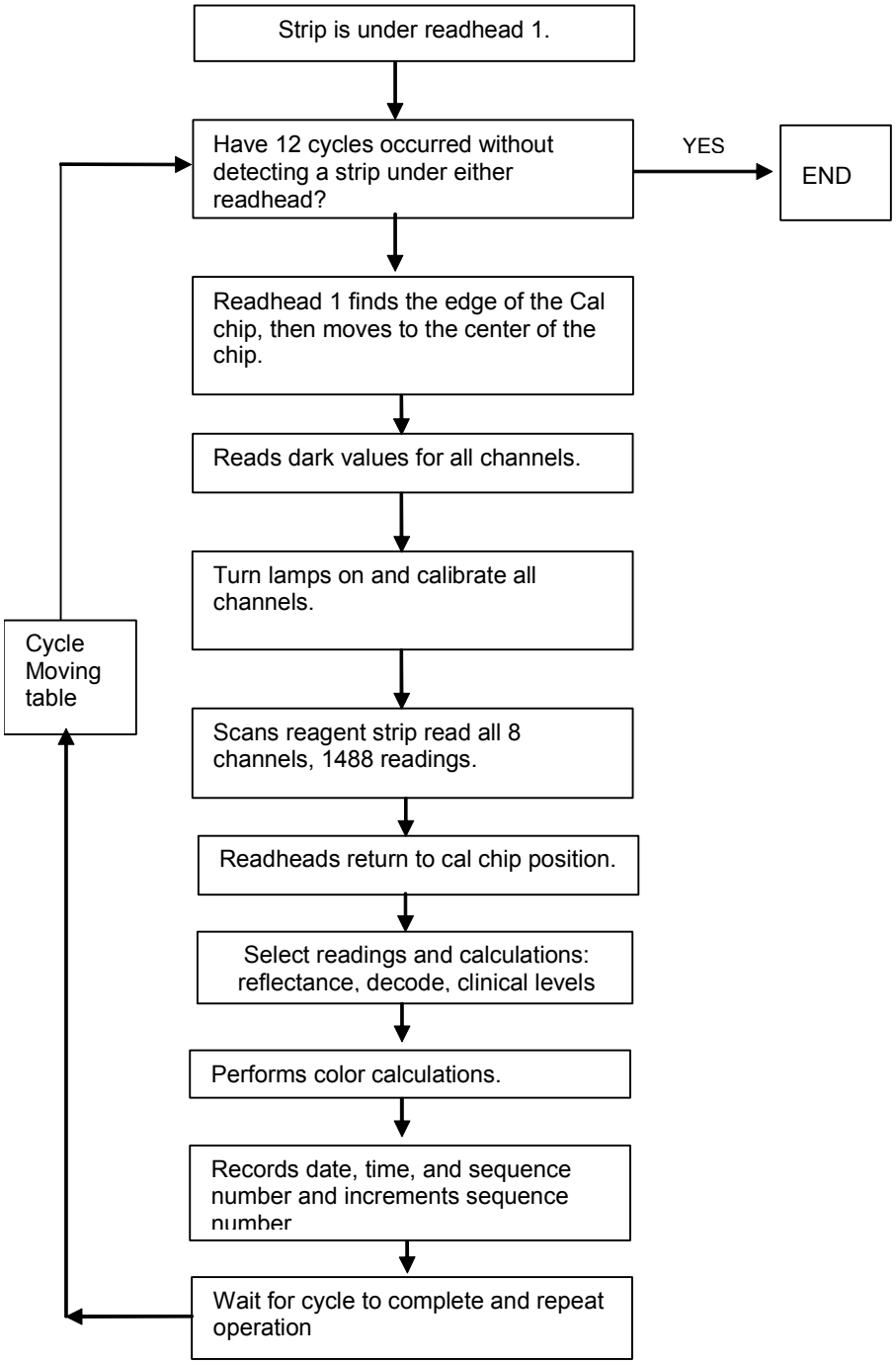


Figure 1-2 Readhead Troubleshooting Block Diagram

Pre-AMP PCB Theory

The Clinitek Advantus analyzer has 2 functionally identical readheads. The heart of each readhead is the surface mounted detector package. This device has 4 separate channels, each with its own optical filter: one green, one infrared (IR), one blue and one red. Each of the channels has its own photo detector output. The output of the detector is passed through a 2-stage Pre-AMP and its output through connector P1.

The op-amps used on the Pre-AMP operate from a +5 VDC and -5 VDC power supply located on the A/D PCB. When the system positions the readheads over the calibration chip and the lamps are on, the output of each of the Pre-AMP channels should be approximately +4 VDC. With the readhead lamp off, the outputs of the pre-amp channels should be approximately 0 VDC. Because the op-amps operate from both a positive and negative supply, you may observe up to a +0.4 VDC or -0.4 VDC.

Pre-AMP A/D PCB Theory

The Pre-AMP A/D PCB receives the analog signals from both Pre-AMP PCBs and converts these voltages to digital values. This count is the raw value that is used in the algorithms to calculate reflectance.

IC U1 is an 8-channel analog multiplexing A/D converter with serial output and performs the analog to digital conversion.

There are also 4 voltage regulators on the PCB.

- VR1 provides a +4 VDC reference for the A/D converter.
- VR2 provides the +5 VDC used by both readheads pre-amp PCB and the A/D board.
- VR3 provides the -5 VDC used by both readhead pre-amp PCB’s and the A/D board.
- VR4 provides the +6 VDC for the lamps in both readheads.

Power is supplied to the A/D PCB from the MOTHER PCB via connector P3 (PL10 on MOTHER PCB):

- pins 9 and 10 provide +12 VDC
- pin 6 provides -12 VDC
- pins 2, 8, 11, and 12 are ground

Strip Detector

The strip detector contains 5 high output red LEDs and 4 detectors spaced between the LEDs.

NOTE: Currently, the system does not use the LED at the left of the detector.

Every 100 milliseconds, when the push bar is at the left-most position, one of the LEDs is pulsed on for about 16 microseconds. The 5 strip detectors LEDs are turned on one at a time, sequentially from the timer interrupt routine. The analyzer disables the LEDs during the time the push bar is moving or is located at the right side.

Light reflected back by the presence of a strip is picked up by an associated detector and triggers a level sensitive circuit connected to an input port on the processor. Each detector has 2 detection-level-setting circuits associated with it, one for each of the 2 LEDs with which it operates. The system calibrates the detection levels only when the analyzer power is turned on, when no strip is on the table.

NOTE: For proper detector calibration, the fixed platform needs to be in place when the analyzer's power is on.

For each of the 8 detector-LED pairs, the detection level count is found where light from the table causes detection. Then the setting is increased by a percentage of the count for low level signals. For high level signals it adds a constant, so that a strip is necessary to cause detection. When the system prints out the strip detector setup using the analyzer test card, the printout shows the detector calibration values for both of its LEDs. Refer to *Using the Reflectance Test*, page 4-59.

Notice that L5D5 is printed twice. The second calibration level is used for the strip verification position and has a lower detector gain setting to prevent false verification.

NOTE: The set-up value L1D1 is calculated but is not used by the software.

The calibration compensates for variations in LED output, detector sensitivity, and table reflectance changes. The strip detector is AC coupled, to reduce the effect of ambient light. The following is an example of a strip detector set-up print-out:

```
L1D1 L2D1 L2D2 L3D2

L3D3 L4D3 L4D4 L5D5 L5D5
```

The detector circuits require both +12 VDC and -12 VDC for operation, supplied by connector P1 (PL9 on MOTHER PCB).

Pins 1, 4, and 5	Ground
Pin 2	-12 VDC
Pin 3	+12 VDC

The analyzer only calibrates the strip detector during the power on cycle.

Methods Overview

The Clinitek Advantus Urine Chemistry Analyzer is a scanning reflectance photometer, which reads the change in color on Bayer HealthCare Multistix Reagent Strips. Refer to the product insert provided with the specific Multistix Reagent Strips being used for a description of its methods.

Operations and Procedures

For general operating instructions, refer to the *Clinitek Advantus Operator's Guide, Section 2, Operating the Analyzer.*

Rebooting the Analyzer

You can only access the Reboot Analyzer button when you are in the Factory Test Mode.

1. Access the Factory Test Mode.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.

2. Select **INSTRUMENT TEST**.
3. Select **REBOOT SYSTEM**.

The Reboot Analyzer function sends an <ESC> command to processor 2 that restarts the application at the power on function. Processor 1 (MAIN PCB) goes to the initialization program. These actions allow re-initialization without turning the power off and on.

Customizing Instrument Ranges

Clinitek Advantus analyzer customers can customize analyzer ranges of certain tests:

- Glucose
- Ketone
- Bilirubin
- Blood
- Protein
- Urobilinogen
- Leukocytes

Customers who choose to alter analyzer ranges should collect data from a statistically significant number of samples for comparison to the reference method(s). Setting the analyzer in Test Mode 2 adds a printout of raw decode data above each set of test results and gives the customer the necessary data to customize their analyzers.

NOTE: Before customizing their analyzers, customers must know that the performance characteristics stated by Bayer HealthCare for that analyte are no longer valid. Validation of the new ranges and expected results become the responsibility of the customer.

Using Result Format – Test Mode 2

Use Result Format – Test Mode 2 to set the analyzer up to add a printout of raw decode data above each set of test results. Customers can use this information to collect data for comparison to re reference method.

NOTE: By design, selecting Test Mode 2 disables the computer port and turns the internal printer off. In this mode, you cannot enable the computer port. You can turn the printer on in Printer Setup.

1. At the Ready/Run screen, select **Menu**.
2. At the Menu screen, select **Setup**.

   The Setup screen displays navigation arrows.
3. Press the right-pointing navigation arrow 7 times to display the Setup screen that includes Computer Port Options.
4. Select **Computer Port Options**.
5. At the Computer Port Options screen, double-select the hidden button below the Set options title in the title bar.

   This displays another option, Results Format – Clinical. The default format is Clinical.
6. Select **Results Format – Clinical**.

   The button changes to Results Format – Test Mode 1. If you select the button again, it changes to Results Format – Test Mode 2. Selecting it again cycles the selection back to Results Format – Clinical.
7. To set up the system for data review, cycle the Result Format until it displays **Result Format – Test Mode 2**.

   The results for each test strip now print to the internal printer as raw data and as clinical results.
8. Select the left-pointing arrow 8 times to return to printer setup screen.
9. Select **INTERNAL PRINTER** to toggle it back to on**.**

Altering Ranges

The Clinitek Advantus analyzer offers the customer the ability to customize sensitivity of the clinical ranges of certain tests. This function allows the customers to actually adjust the upper limit for each clinical range thus altering the sensitivity of the analyzer.

If a customer elects to use this option and adjusts the range for any analyte, the performance characteristics stated by Bayer HealthCare for that analyte are no longer valid. Validation of the new ranges and expected results become the responsibility of the customer.

1. At the Ready/Run screen, select **Menu**.
2. At the Menu screen, select **Setup**.

   The Setup screen displays navigation arrows.
3. Select the right-pointing navigation the key 8 times to the last Set Options screen.

   The first option on this screen is Reset all features to defaults.
4. Double-select the hidden button under the Set Options title in the title bar.

   This displays the button labeled Alter test ranges.
5. Select **Alter test ranges**.

   A warning screen is displayed stating that the results memory will be deleted if you continue.
   a. To continue, select **Yes**.
   b. To return to the Ready/ Run screen, select **No**.

      The screen displays the tests that can be altered. The test names are indicated by a 3-letter abbreviation.
6. Select the test you want to alter.

   The display changes to show the clinical level of the selected test.
7. Select **Use defaults – on**.

   The option toggle to off and the screen buttons are enabled to allow you to alter the test values.
8. Use the up-and-down arrow keys to scroll through the test limits.
9. Use the plus and minus keys to alter the selected limit.

   NOTE: Increasing the limit by using the plus (+) button decreases the analyzer's sensitivity. Decreasing the limit using the minus (–) key increases the analyzer's sensitivity. For example, increasing the NEGATIVE decodes for BLO (blood) reduces the number of trace blood urines. On-screen messages alert you to the outcome of your change.
10. After completing all desired clinical range adjustments, select the Return to Ready Run button to save the changes to the configuration.

Printer Report Formats

This section defines the report formats used for all printed reports. The analyzer supports 3 different printers:

- Clinitek Advantus internal printer
- 80 column printer
- Form printer

Not all report formats are available for all printers. Printer selections are made on the Printer Options screen.

Calibration Confirmation Report

This report is available from Screen: Report Options.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, results are printed on the internal printer.

This report is not available for the Form printer.

Printer Format

line 1	Clinitek Advantus
line 2	Calibration Successful
line 3	AAAAAAAA BBBBBB BB

Report Variable Field Descriptions

Variable	Description
A	Represents the date of the test. The date is displayed in the date format set by the customer.
B	Represents the time of the test including AM or PM as appropriate. The time is displayed in the time format set by the customer.

Load List Report

This report is available by pressing the Print button from the Sample ID Entry screen or the Report Options screen.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, results are printed on the internal printer.

This report is not available for the Form printer.

Printer Format

A maximum of 3 lines is printed for each entry in the load list and a minimum of one line.

line 1	Clinitek Advantus
line 2	Load List
line 1	AAA. BBBBBBBBBBBB CCCC
line 2	DDD EEEEEEEEEEEEEE
line 3	FFF GGGGGGGGGGGGGG
line 4	AAA. BBBBBBBBBBBB CCCC
line 5	DDD EEEEEEEEEEEEEE
line 6	FFF GGGGGGGGGGGGGG

Report Variable Field Descriptions

Variable	Description
A	Represents the position of the ID in the load list.
B	Represents the ID.
C	If the ID has been assigned to a test strip, printed as 'Done'; otherwise not printed.
D	If Color is set to On on Screen: Tests to Report and Their Order, printed as COL; otherwise this line is not printed.
E	If Color is set to On on Screen: Tests to Report and Their Order, printed as the Color value assigned to this test; otherwise this line is not printed.
F	If Clarity is set to On on Screen: Tests to Report and Their Order, printed as CLA; otherwise this line is not printed.
G	If Clarity is set to On on Screen: Tests to Report and Their Order, represents the Clarity value assigned to this test; otherwise this line is not printed.

Clinical Results format for Patient and Control Results

The same report format is used for patient test results and Control test results. Likewise, the same format is used for printing new test results, printing edited test results, and printing recalled results.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, results are printed on the internal printer.

If both the internal printer and a Form printer are set to on, new test results, edited test results, and recalled test results are printed on the Form printer.

Internal Printer Format

Although the number of lines between each result set is operator selectable for patient results, 2 lines are always between Control results.

Form Printer Format

line 1	AAAAA BBBBBBBB CCCCCCC
line 2	Tech ID: DDD
line 3	ID: EEEEEEEEEEEE
line 4	Test: LLLLLLLLLLLLLL
line 5	FGHHH IIIIIIIIIIIII
line 6	FGHHH IIIIIIIIIIIII
line 7	FGHHH IIIIIIIIIIIII
line 8	FGHHH IIIIIIIIIIIII
line 9	FGHHH IIIIIIIIIIIII
line 10	FGHHH IIIIIIIIIIIII
line 11	FGHHH IIIIIIIIIIIII
line 12	FGHHH IIIIIIIIIIIII
line 13	FGHHH IIIIIIIIIIIII
line 14	FGHHH IIIIIIIIIIIII
line 15	FGHHH IIIIIIIIIIIII
line 16	FGHHH IIIIIIIIIIIII
line 17	KKKKKKKKKKKKKK
line 17	JJJJJJJJJJJJJJJJJ

Report Variable Field Descriptions

Variable	Description
A	Represents the Sequence Number.
B	Represents the date of the test. The date is displayed in the date format set by customer.
C	Represents the time of the test. The time is displayed in the time format set by customer.
D	Represents the Tech ID. If the “Tech ID” option is set to off on Screen: Protected Setup (7/8), not printed.
E	Represents the ID. If the “Sample IDs” option is set to off on Screen: Protected Setup (7/8), not printed.
F	Printed as an asterisk (*) if the test result is positive; otherwise not printed.
G	Printed as an exclamation symbol (!) if the test result has been edited; otherwise not printed.
H	Represents the test abbreviation.
I	Represents the clinical value of the test result. A second line of the result is defined for A:C or P:C tests, see K below.
J	Represents the operator defined header when the Internal Printer option is set to 'on with 12 blank lines between patient result sets'; otherwise this line is not printed.
K	Represents the label (ABNORMAL, HIGH ABNORMAL) for a A:C or P:C test result.
L	Represents the urine strip test name used to conduct the analysis.

One test result line is printed for each test selected to be reported on Screen: Tests Reported and Their Order. The printed order of the tests is the order selected on this screen. Line 16 is only printed if the Internal Printer option is set to ‘on with 12 blank lines between patient result sets.’

80-Column Printer Format

The format for clinical results is a left-aligned triple column format. Line 1 of each page contains the page number of the results report. There is one blank line between result sets.

If only one test result is reported, lines 3, 4, and 5 are not printed. If only 2 test results are reported, lines 4 and 5 are not printed. Results are never printed across the paper perforation.

To accommodate the printing restrictions associated with ink jet and laser jet printers, a form feed is issued after line 56 on each page. Form feeds are also issued at the end of the results printed for each RUN.

line 1	Page JJJ		
line 2	AAAAA BBBBBBBB CCCCCCC Tech ID: DDD ID: EEEEEEEEEEEE		
line 3	Test: MMMMMMMMMMMM		
line 4	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII
line 5	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII
line 6	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII
line 7	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII	FGHHH IIIIIIIIIIIIII
line 8	FGA:C KKKKKKKKKKKKKKKKKKKKKKKKK		
line 9	FGP:C LLLLLLLLLLLLLLLLLLLLLLLLL		

Printer Order

The following table contains the print order for the test results:

1	5	9
2	6	10
3	7	11
4	8	12
A:C		
P:C		

Report Variable Field Descriptions

Variable	Description
A	Represents the Sequence Number.
B	Represents the date of the test. The date is displayed in the date format set by the customer.
C	Represents the time of the test. The time is displayed in the time format set by the customer.
D	Represents the Tech ID. If the “Tech ID” option is set to off on Screen: Protected Setup (7/8), not printed.
E	Represents the ID. If the “Sample ID” option is set to off on Screen: Protected Setup (7/8), not printed.
F	Printed as an asterisk (*) if the test result is positive; otherwise not printed.
G	Printed as an exclamation symbol (!) if the test result has been edited; otherwise not printed.
H	Represents the test abbreviation.
I	Represents the test result.
J	Represents the page number.
K	Test result for the A:C ratio. For the 80-column printer only, both the numeric value and qualitative label will print on a single line using the format ‘numeric value, label.’
L	Test result for the P:C ratio. For the 80 column printer only, both the numeric value and qualitative label will print on a single line using the format ‘numeric value, label.’
M	Represents the urine strip test name used to conduct the analysis.

Results Not Available Report

The same report format is used for the list of patients for whom results are not available due either to the operator canceling the test or to the test being terminated by the Analyzer due to a reported error condition.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, results are printed on the internal printer.

This report is not available for the Form printer.

Internal Printer Format

The last line of the report is followed by 2 blank lines.

80-Column Printer Format

The last line of the report is followed by 2 blank lines.

Report Format with IDs set to on

```
Line 1  Clinitek Advantus
line 2  Results Not
line 3  Available
line 2  AAAAA ID:BBBBBBBBBBBBBB
line 3  AAAAA ID:BBBBBBBBBBBBBB
.
.
.
line n  AAAAA ID:BBBBBBBBBBBBBB
```

Report Variable Field Descriptions

A	Represents the Sequence Number.
B	Represents the ID.

Report Format with IDs set to off

```
line 1  Results Not Available
line 2  AAAAA
line 3  AAAAA

line n  AAAAA
```

Report Variable Field Descriptions

A	Represents the Sequence Number.

Confirmatory Report and Microscopics Report

The Confirmatory report lists the patients whose tests have met the Confirmatory flags criteria. The Microscopics report lists the patients whose tests have met the Microscopics flags criteria. The format of the 2 reports is identical. They are differentiated by their header.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, the report is printed on the internal printer.

This report format is not available for the Form printer.

Internal Printer Format / 80-Column Printer Format

```
Line 1    Clinitek Advantus
line 2    AAAAAAAAAAAAAAAAAA
line 3    BBBBBBBB CCCCC CC
line 4
line 5    DDDDD ID: EEEEEEEEEEEE
line 6    FFF FFF FFF FFF FFF
line 7
line 8    DDDDD ID: EEEEEEEEEEEE
line 9    FFF FFF FFF FFF FFF
```

Report Variable Field Descriptions

A	Printed as Confirmatory Report or Microscopics Report.
B	Represents the date of the RUN. The date is displayed in the date format set by customer.
C	Represents the time of the RUN. The time is displayed in the time format set by customer.
D	Represents the Sequence Number.
E	Represents the ID. If the “Sample IDs” option is set to off on Screen: Protected Setup (7/8), not printed.
F	Represents the test which met the report criteria.

Two lines are printed for each patient. One blank line separates patient data.

Microscopics Data Entry Report

The Microscopics data entry report shows the data entered by a user and attached to a given urine strip result.

Printer Priorities

Results are printed to whatever combination of printers is selected: Internal only, external only, or both.

Internal Printer Format / 80-Column Printer Format

The strip test results are followed immediately by a printout of the entered microscopy data. The data format is the same regardless of performing in Clinical Mode or Test Mode 1 & 2.

```
line 1   MICROSCOPICS RESULTS

line 2   AAAAAAAAAAAAAAABBBBBCCCCC

line 3   DDDDDDDDDDDDDEEEEEFFFFF

line 4   GGGGGGGGGGGGGHHHHHIIIII

line 5   JJJJJJJJJJJJJKKKKKLLLLL

line 6   MMMMMMMMMMMMMNNNNNOOOOOO

line 7   PPPPPPPPPPPPPQQQQQRRRRRR
```

Report Variable Field Descriptions:

A	Represents the users choice of Microscopics header 1
B	Represents the entered microscopics data associated with header 1
C	Represents the users choice of units associated with microscopics header 1
D	Represents the users choice of Microscopics header 2
E	Represents the entered microscopics data associated with header 2
F	Represents the users choice of units associated with microscopics header 2
G	Represents the users choice of Microscopics header 3
H	Represents the entered microscopics data associated with header 3
I	Represents the users choice of units associated with microscopics header 3
J	Represents the users choice of Microscopics header 4
K	Represents the entered microscopics data associated with header 4
L	Represents the users choice of units associated with microscopics header 4
M	Represents the users choice of Microscopics header 5
N	Represents the entered microscopics data associated with header 5
O	Represents the users choice of units associated with microscopics header 5
P	Represents the users choice of Microscopics header 6
Q	Represents the entered microscopics data associated with header 6
R	Represents the users choice of units associated with microscopics header 6

If any of the above headers are not required by the user, as an example, if the heading was left set to None (or left blank, in the case of the Custom Header), then the corresponding line on the printout is omitted.

If a header was set up but no data was entered for that header, then the printout should show the corresponding header with a blank results field.

Results Error Report

The Results Error report lists the samples for which clinical results are not available because an error was reported during the calculation of at least one of the results. This type of an error is not an analyzer or analyzer error, it affects only the results of the sample for which the error is reported and does not stop the RUN. This report is displayed after the Confirmatory and Microscopic reports.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, the report is printed on the internal printer.

This report format is not available for the Form printer.

Internal Printer Format / 80-Column Printer Format

```
line 1   Results Error Report

line 2   AAAAAAAA BBBBBBB

line 3

line 4   CCCCC ID: DDDDDDDDDDDDD

line 5   CCCCC ID: DDDDDDDDDDDDD


line n   CCCCC ID: DDDDDDDDDDDDD
```

Report Variable Field Descriptions

A	Represents the date of the RUN. The date is displayed in the date format set by customer.
B	Represents the time of the RUN. The time is displayed in the time format set by customer.
C	Represents the Sequence Number.
D	Represents the ID. If the “Sample IDs” option is set to off on Screen: Protected Setup (7/8), not printed.

One line is printed for each sample.

Analyzer Configuration Report

This report lists the operator selectable options and their current setting.

Printer Priorities

If both the internal printer and an 80-column printer are set to on, this report is printed on the 80-column printer.

This report is not available for the Form printer.

Internal Printer Format

The printer advances 2 lines after the report is printed.

```
line 1   Clinitek Advantus
```

```
line 2   System Configuration
line 3   AAAAAAAA BBBBBBB
line 4   SCHH
line 5   Software Version:
line 6   CC.CC:CCC/CC.CC
line 7
line 8   User Interface Settings
line 9   Language:
line 10  DDDDDDD
line 11  Result units:
line 12  DDDDDDDDDDDD
line 13  PLUS analyzer:
line 14  DDD
line 15  Strip:
line 16  DDDDDDDDDDDDDDDDDDDDDD
line 17  Alternative Strip:
line 18  DDDDDDDDDDDDDDDDDDDDDD
line 19  Date format:
line 20  DDDDDDDD
line 21  Date separator:
line 22  DDD
line 23  Time format:
line 24  DDDDDDD
line 25  Time separator:
line 26  DDD
line 27
line 28  Test Settings
line 29  Tests to be Reported
line 30  and Their Order:
line 31  EEE*
line 32  EEE*
```

```
line 33  EEE*
line 34  EEE*
line 35  EEE*
line 36  EEE*
line 37  EEE*
line 38  EEE*
line 39  EEE*
line 40  EEE*
line 41  EEE*
line 42  EEE*
line 43  EEE*
line 44  Color:**
line 45  DDDDDDDDDDDDDDDDDDDDD
line 46  Color values:**
line 47  DDDDDDDDDDDDDDD (def)
line 48  DDDDDDDDDDDDDDD*
line 49  DDDDDDDDDDDDDDD*
line 50  DDDDDDDDDDDDDDD*
line 51  DDDDDDDDDDDDDDD*
line 52  DDDDDDDDDDDDDDD*
line 53  DDDDDDDDDDDDDDD*
line 54  Clarity values:**
line 55  DDDDDDDDDDDDDDD (def)
line 56  DDDDDDDDDDDDDDD*
line 57  DDDDDDDDDDDDDDD*
line 58  DDDDDDDDDDDDDDD*
line 59  DDDDDDDDDDDDDDD*
line 60  Use Default COL/CLA:
line 61  DDD
line 62  Mark positives:
line 63  DDD
```

```
line 64  First Positive Level:
line 65  EEE DDDDDDDDDDDDDDD*@#
line 66  EEE DDDDDDDDDDDDDDD*@#
line 67  EEE DDDDDDDDDDDDDDD*@#
line 68  EEE DDDDDDDDDDDDDDD*@#
line 69  EEE DDDDDDDDDDDDDDD*@#
line 70  EEE DDDDDDDDDDDDDDD*@#
line 71  EEE DDDDDDDDDDDDDDD*@#
line 72  SG Lower Normal Limit:**
line 73  DDDDDDD
line 74  SG Upper Normal Limit:**
line 75  DDDDDDD
line 76  pH Lower Normal Limit:**
line 77  DDDDD
line 78  pH Upper Normal Limit:**
line 79  DDDDD
line 80  CRE Lower Normal Limit:**
line 81  DDDDD
line 82  CRE Upper Normal Limit:**
line 83  DDDDD
line 84  First Positive Level**
line 85  for COL:**@
line 86  DDDDDDDDDDDDDDD
line 87  First Positive Level**
line 88  for CLA:**@
line 89  DDDDDDDDDDDDDDD
line 90  Confirmatory Flags A:***@
line 91  EEE EEE EEE EEE EEE
line 92  Confirmatory Flags B:***@
line 93  EEE EEE EEE EEE EEE
line 94  Microscopics Flags:***@
```

```
line 95  EEE EEE EEE EEE EEE
line 96  Edit flagged results:
line 97  DDD&
line 98  Tests Using Altered
line 99  Ranges****
line 100 EEE EEE EEE EEE
line 101 FFFFFFFF  GGGG
line 102
line 103 Analyzer Settings
line 104 Tech ID:
line 105 DDD
line 106 Sample IDs:
line 107 DDD
line 108 Password for Setup:
line 109 DDD
line 110 Internal printer:
line 111 DDDDDDDDDDDDDDD
line 112 External printer:
line 113 DDDDDDDDD
line 114 Custom Header:*****
line 115 DDDDDDDDDDDDDDDDDDDD
line 116 Microscopics Headings:
line 117 JJJJJJJJJJJ KKK
line 118 JJJJJJJJJJJ KKK
line 119 JJJJJJJJJJJ KKK
line 120 JJJJJJJJJJJ KKK
line 121 JJJJJJJJJJJ KKK
line 122 JJJJJJJJJJJJJ KKKKK
line 123 QC:
line 124 DDDDDDDDDDDDDDDDDDDDDDDD
line 125 QC interval:
```

```
line 126 DD Days
line 127 Computer link
line 128 Port:
line 129 DDDDDD
line 130 Baud Rate:
line 131 DDDDDD
line 132 Data Bits/Par.:
line 133 DDDDDD
line 134 Output Format:
line 135 DDDDDD
line 136 Checksum:
line 137 DDDDDD******
line 138 Handshake:
line 139 DDDDDD******
line 140 Network settings
line 141 IP Configuration:
line 142 DDDDDD
line 143 IP Address:
line 144 DDD.DDD.DDD.DDD
line 145 DHCP name:
line 146 DDDDDD
line 147 Subnet mask:
line 148 DDD.DDD.DDD.DDD
line 149 Gateway:
line 150 DDD
line 151 Gateway address:
line 152 DDD.DDD.DDD.DDD
line 153 MAC address:
line 154 DD.DD.DD.DD.DD
line 155 Ignore Leading BC Char.:
line 156 D
```

```
line 157 Ignore Trailing BC
line 158 Char.:
line 159 D
```

Report Variable Field Descriptions

A	Represents the date of the test. The date is displayed in the date format set by customer.
B	Represents the time of the test. The time is displayed in the time format set by customer.
C	Represents the Software Versions of the processors.
D	Represents the current option for a analyzer setting.
E	Represents a test abbreviation.
F	Represents a test result that has been altered.
G	Represents the altered decode value.
H	Two digit value for Strip Centering (SC) information
J	Represents the header for each of the 6 microscopic data entry fields
K	Represents the units associated with the given microscopic data entry field
#	The PRO reported is only for the selected strip type.
@	The option for this line is printed as N/A if the Mark Positives options is set to off.
&	The option for this line is printed as N/A if no confirmatory flags are set up.
*	This line is not printed if the corresponding test is not selected on the Tests to Report and Their Order screen.
**	The option for this line is printed as N/A if the corresponding test is not selected on the Tests to Report and Their Order screen.
***	The option for this line is printed as None if no tests are selected for the flag criteria.
****	This option is not printed if Altered Ranges are not in use.
*****	The option for this line is printed as N/A if the Internal Printer option on the Printer Options screen is not set to on with 12 blank lines between patient result sets.
******	The option for this line is printed as N/A if the Output Format is set to CCS.

80-Column Printer Format

The printer issues a form feed after the report is printed.

```
line 1   System Configuration      ......        Page FFF

line 2   AAAAAAAA BBBBBBB

line 3   SCJJ

line 4   Software Version: CC.CC/CC.CC

line 5

line 6   User Interface Settings

line 7   Language: DDDDDDD

line 8   Result units: DDDDDDDDDDDDDDDDDDD

line 9   PLUS analyzer: DDD

line 10  Test: DDDDDDDDDDDDDDDDDDDDDDD

line 11  Alternative Test: DDDDDDDDDDDDDDDDDDDDDDDDD

line 12  Date format: DDDDDDDD

line 13  Date separator: DDD

line 14  Time format: DDDDDDD

line 15  Time separator: DDD

line 16

line 17  Test Settings

line 18  Tests to be Reported and Their Order:

line 19  EEE EEE EEE EEE EEE EEE EEE EEE EEE EEE EEE EEE
EEE

line 20  Color: DDDDDDDDDDDDDDDDDDDDD**

line 21  Color values:**

line 22  DDDDDDDDDDDDDDD (default)

line 23  DDDDDDDDDDDDDDD*

line 24  DDDDDDDDDDDDDDD*

line 25  DDDDDDDDDDDDDDD*

line 26  DDDDDDDDDDDDDDD*

line 27  DDDDDDDDDDDDDDD*

line 28  DDDDDDDDDDDDDDD*
```

line 29 Clarity values:**

line 30 DDDDDDDDDDDDDDD (default)

line 31 DDDDDDDDDDDDDDD*

line 32 DDDDDDDDDDDDDDD*

line 33 DDDDDDDDDDDDDDD*

line 34 DDDDDDDDDDDDDDD*

line 35 Use Default COL/CLA: DDD

line 36 Mark Positives: DDD

line 37 First Positive Level:

line 38 EEE DDDDDDDDDDDDDDD*@#

line 39 EEE DDDDDDDDDDDDDDD*@#

line 40 EEE DDDDDDDDDDDDDDD*@#

line 41 EEE DDDDDDDDDDDDDDD*@#

line 42 EEE DDDDDDDDDDDDDDD*@#

line 43 EEE DDDDDDDDDDDDDDD*@#

line 44 EEE DDDDDDDDDDDDDDD*@#

line 45 SG Lower Normal Limit: DDDDDDD**@

line 46 SG Upper Normal Limit: DDDDDDD**@

line 47 pH Lower Normal Limit: DDDDDDD**@

line 48 pH Upper Normal Limit: DDDDDDD**@

line 49 CRE Lower Normal Limit: DDDDDDD**@

line 50 CRE Upper Normal Limit: DDDDDDD**@

line 51 First Positive Level for COL: DDDDDDDDDDDDDDD**@

line 52 First Positive Level for CLA: DDDDDDDDDDDDDDD**@

line 53 Flags for Confirmatory Report A: EEE EEE EEE EEE EEE***@

line 54 Flags for Confirmatory Report B: EEE EEE EEE EEE EEE***@

page break

line 1   Analyzer Configuration   ......   Page FFF

line 2   Flags for Microscopics Report: EEE EEE EEE EEE EEE***@

line 3   Edit flagged results: DDD

line 4   Tests Using Altered Ranges:****

```
line 5   EEE EEE EEE EEE EEE EEE EEE EEE****
line 6   GGGGGGGGGG HHHH****
line 7
line 8   Analyzer Settings
line 9   Tech ID: DDD
line 10  Sample IDs: DDD
line 11  Password for Setup: DDD
line 12  Internal printer: DDDDDDDDDDDDDDD
line 13  External printer: DDDDDDDDD
line 14  Custom Header: DDDDDDDDDDDDDDDDDDDD*****
line 15  Microscopics Headings:
line 16  KKKKKKKKKKK LLL
line 17  KKKKKKKKKKK LLL
line 18  KKKKKKKKKKK LLL
line 19  KKKKKKKKKKK LLL
line 20  KKKKKKKKKKK LLL
line 21  KKKKKKKKKKKKK LLLLL
line 22  QC: DDDDDDDDDDDDDDDDDDDDD
line 23  QC Interval: DD Days
line 24  Computer link:
line 25  Port: DDD
line 26  Baud Rate: DDDD
line 27  Data Bits/Par.: D/DDDD
line 28  Output Format: DDDDDD
line 29  Checksum: DDD******
line 30  Handshake: DDD******
line 31  Network Settings
line 32  IP Configuration: DDDDDD
line 33  IP Address: DDD.DDD.DDD.DDD
line 34  DHCP name: DDDDDD
line 35  Subnet mask: DDD.DDD.DDD.DDD
```

```
line 36  Gateway: DDD
line 37  Gateway address: DDD.DDD.DDD.DDD
line 38  MAC address: DD.DD.DD.DD.DD
line 39  Ignore Lead. BC Char.: D
line 40  Ignore Trail BC Char.: D
```

Report Variable Field Descriptions

A	Represents the date of the test. The date is displayed in the date format set by customer.
B	Represents the time of the test. The time is displayed in the time format set by customer.
C	Represents the Software Versions of the processors.
D	Represents the current option for a analyzer setting.
E	Represents a test abbreviation.
F	Page number
G	A decode range that has been altered
H	The decode value associated with the altered range
J	Two-digit value for Strip Centering (SC) information
K	Represents the header for each of the 6 microscopic data entry fields
L	Represents the units associated with the given microscopic data entry field
#	The PRO reported is only for the selected strip type.
@	The option for this line is printed as N/A if the Mark Positives option is set to off
*	This line is not printed if the corresponding test is not selected on the Tests to Report and Their Order screen.
**	The option for this line is printed as N/A if the corresponding test is not selected on the Tests to Report and Their Order screen.
***	The option for this line is printed as None if no tests are selected for the flag criteria.
****	This option is not printed if Altered Ranges are not in use.
*****	The option for this line is printed as N/A if the Internal Printer option on the Printer Options screen is not set to 'on with 12 blank lines between patient result sets.’
******	The option for this line is printed as N/A if the Output Format is set to CCS.

Test Mode Results

Test Mode 1 results always print in a set order. An example is as follows:

```
000006   19981006180200
ERRORS: 0000   POS: 43
Tech ID: 1111112222233
ID: 3234567890123
COL  A  B  L  CD
     +851 +113 +265 +000
SRV I  R  G  B  DCD
GLU 817 310 568 456 1558
BIL 713 588 435 296 0610
KET 734 604 477 331 0649
SG 726 474 398 133 1201
pH 719 486 392 130 0677
PRO 695 273 332 235 0435
URO 719 735 538 143 0747
NIT 697 606 288 280 0476
BLO 126 123 123 125 0124
LEU 608 442 279 244 1000
LE1 653 486 311 262 0477
```

Test Mode 2 results print Test Mode 1 results format, a blank line, and then the list of test labels and clinical result values. The clinical result portion of the printout is in the order as set by the Tests to Report and Their Order option.

Installation

Refer to the *Clinitek Advantus Operator's Guide, Section 8, Configuration*.

Maintenance, Alignments, and Repair

This section contains instructions for servicing the Clinitek Advantus Urine Chemistry Analyzer.

Cleaning and Preventive Maintenance

This section describes the cleaning and preventative maintenance procedures to perform whenever a Clinitek Advantus analyzer is in your possession. Follow these procedures to help identify possible analyzer weaknesses before they become field failures.

Perform the preventive maintenance procedures in this section when servicing this analyzer. Before returning the analyzer to the customer, you must perform the *Service Release Testing*, page 4-61.

Cleaning the Clinitek Advantus Analyzer

For information about cleaning the analyzer, refer to the *Clinitek Advantus Analyzer Operator's Guide, Maintenance.*

Lubricating the Push Bar Slide Arm Shaft

For detailed instruction about disassembling and reassembling the analyzer, refer to the *Clinitek Advantus Operator's Guide,* Section 5*, Maintenance*.

1. Turn the analyzer off.
2. Remove the push bar, fixed platform, holddown plate, and moving table.

   For information about removing these components, refer to the *Clinitek Advantus Operator's Guide*, Section 5, *Performing the Daily Cleaning*.
3. Clean both the push bar slide arm shaft and lower guide with alcohol.

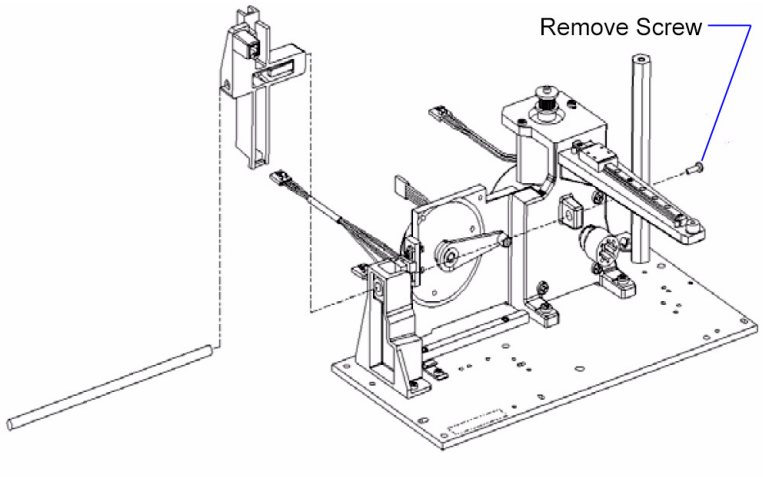


Figure 4-1 Push Bar Assembly

4. Apply a thin coat of Lubriplate 630-AA multi-purpose grease to the shaft and guide.

Part	Size	Part Number
Lubriplate 630 – AA multipurpose grease	1-3/4 ounce	50336008
Lubriplate 630 – AA multipurpose grease	3/8 ounce	50336040

5. Replace the tables and push bar.
6. Move the slide arm several times to spread the lubrication.
7. Turn analyzer power on.

Alignments and Adjustments

This section provides detailed information required for making necessary alignments and adjustments during the ordinary course of repair on the Clinitek Advantus Analyzer. It also describes what special fixtures are required and how to use them.

Adjusting the Power Supply Output Voltage

Only the 5-volt power supply output is adjustable. Use potentiometer VR1 to adjust this voltage.

You need the following tools to perform this procedure:

- #2 Phillips screwdriver
- Potentiometer adjustment tool or small blade screwdriver
- Voltmeter

- display extension cable (PN 109456)

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case of the analyzer.

   Refer to *Removing the Upper Case*, page 4-11.

2. Install the Display extension cable (PN 109456).

   This allows for the use of the Display assembly and Main PCB.

3. Measure the output voltage of supply +5 VDC.

   Use Terminal 2 or 3 of J10, the white terminal block on the power supply, as the positive output, and terminal 4 or 5 of J10 or the shield case as the DC Ground.

   The nominal output voltage should be +5 volts DC (Range from 4.75 VDC to 5.25 VDC).

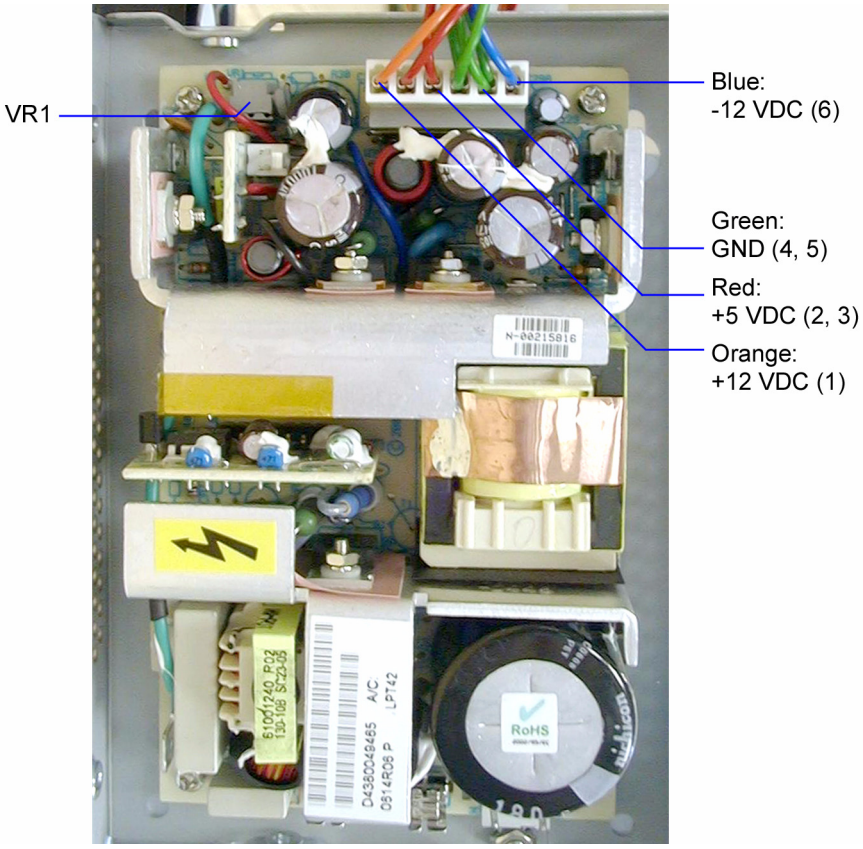


Figure 4-2 Clinitek Advantus with Upper Case Removed

4. If the voltage is not within this range, locate potentiometer VR1 and adjust the voltage while monitoring it on the meter.

- Use a potentiometer adjustment tool or small blade screwdriver to adjust the voltage.
- Gain access through the small slot on the shield case.

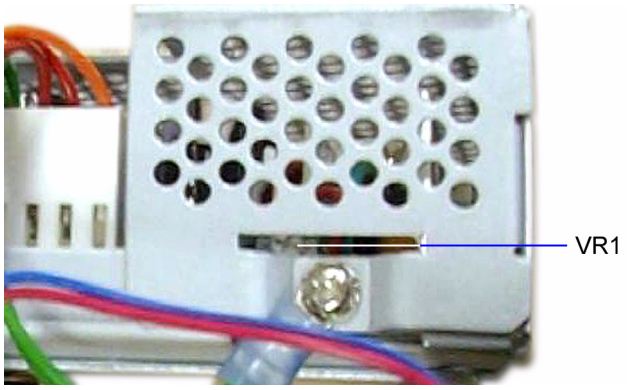


Figure 4-3 Potentiometer

Aligning the Readhead

You need the following tools for this alignment.

- Readhead Alignment and Belt tensioner Fixture (PN 71647017)
- #2 Phillips screwdriver
- 1.5-mm Hex wrench
- Torque driver with1.5-mm Hex bit and #2 Phillips bit
- Cotton Gloves
- display extension cable (PN 109456)
- Factory Test Mode (FTM)

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11
2. Connect the display extension cable.

CAUTION: Do not handle lamps without gloves. You must wear clean white cotton gloves when handling the Preamp PCBs A/D PCB or Lamps. A dirty Preamp PCB can cause errors 02-1 and 02-2.

3. Remove the Preamp PCBs and A/D PCB assembly from the readhead carrier assembly.

Refer to *Removing the Pre-AMP PCBs*, page 4-40

4. Manually move the readhead carrier towards the front of the analyzer 2 to 3 inches (5 cm to 7.5 cm).
5. Install the readhead fixture.
   a. Loosen the 4 Hex screws.
   b. Move the readhead carrier against the fixture.

      Ensure that the readhead is flush against the fixture.
   c. Tighten the 4 mounting screws in the readhead carrier.

   Torque to 5 inch-pounds.
   d. Loosen the readhead drive motor mounting screws.
   e. Apply pressure to the motor until the belt tension indicator is centered on the set-line.
   f. Retighten the motor mounting screws to 12 inch-pounds of torque.
   g. Manually move the readhead carrier away from the alignment fixture.
6. Remove the fixture from the transport assembly.
7. Reinstall the preamps and A/D PCBs to the readhead carrier.

   Refer to *Installing the Pre-AMP PCBs*, page 4-41.
8. Install the moving and fixed platforms on the analyzer.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
9. Power on the analyzer.
10. Enter the Factory Test Mode (FTM).

    Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
11. Access the Test Readheads option:
    a. Select **INSTRUMENT TEST**.
    b. Select **LEVEL 2 TESTS**.
    c. Select **LEVEL 3 TESTS**.
    d. Select **LEVEL 4 TESTS**.
    e. Select **TEST READHEADS**.

       Refer to *Using the Test Readheads Option*, page 4-58.

    The analyzer homes on the cal chip using readhead 1 and readhead 2 and prints the cal chip correction factor. Check that the correction factor is within the limit of
    +3 steps to -3 steps.

    NOTE: The optimal correction factor is between +1 and -1.
12. If the test fails, try the following actions:

- Inspect the readhead and preamps for proper assembly.
- Try a different fixed platform.
- Ensure that table guides are not loose or broken.

13. Re-assemble the analyzer as required to complete servicing.

Realigning the Horizontal Plate

You need the following tools for this procedure.

- Moving table alignment fixture (PN 71647012)
- #2 Phillips screwdriver
- Pliers
- Flatblade screwdriver
- Test Strip

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11

4. Loosen the 2 screws in the horizontal plate.

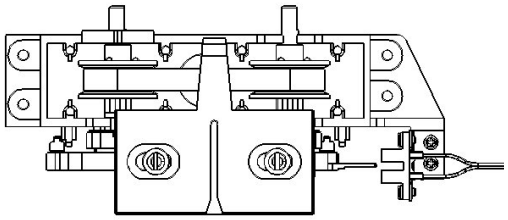


Figure 4-4 Horizontal Plate

5. Install the moving table alignment fixture on the horizontal plate onto the drive housing.
6. Install the fixed platform portion of the alignment fixture.
7. Rotate the mechanism so that the fingers of the moving table are in the up position.

Use a pair of pliers to grasp the motor coupling and rotate it.

8. With the fingers of the moving table in the up position, perform the following steps:
   a. Center the fingers in the slots of the fixed platform portion of the alignment fixture.
   b. Tighten the 2 screws in the horizontal plate of the drive housing.
      Torque the screws to 5 inch-pounds.
   c. Ensure that the horizontal plate is fully to the right, with the chamfer against the locating tab, not riding up on it.
9. Rotate the mechanism so that the fingers of the moving table are in the down position.
10. Remove the alignment fixtures.
11. Reassemble the analyzer.
12. Perform the setup strip centering test and strip walk test.
    Refer to *Setting up Strip Centering Tests*, page 4-66 and *Performing the Strip Walk Test*, page 4-67.
    If either test fails, repeat the alignment procedure.

Cleaning the Printer

You need the following tools to perform this procedure:

- Instrument Test Card
- Cotton-tipped applicators or equivalent
- Isopropyl Alcohol

To clean the printer, perform the following steps:

1. Remove the printer.
   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Lift the print head from the platen by lifting up on the green paper release lever.
3. Use alcohol and a cotton-tipped applicator to clean the surface of the platen to remove any buildup of dirt or wax.

   NOTE: If the platen becomes excessively dirty, it can influence the quality of the printing by creating areas of light printing on the paper.

Adjusting the Sensors

The location and positioning of the optical sensors are designed to eliminate the need for physical adjustments. However, to ensure proper performance the sensors do have optimal positions:

- table in place sensor (left table guide) – positioned fully forward
- crank arm sensor (metal mounting bracket behind the left table guide) – positioned fully left and the table flag centered in the slot
- moving table sensor (right table guide) – positioned fully down

Lubricating the Pusher Bar Slide

You need the following tools to perform this procedure:

- #1 Phillips screw driver
- Lubriplate lubricant
    - 1.75 ounce service size (PN 50336008, REF 07417711)
    - 3/8 ounce customer size, (PN 50336040, REF 02666144)

NOTE: Lubriplate is the only approved lubricant. Using any other lubricant is not supported because the effect on the parts is unknown.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Remove the push bar shaft.

   Refer to *Replacing the Push Bar*, page 4-10.
3. Clean the dirt and old grease off the shaft and slide arm using alcohol.
4. Reassemble the slide arm and shaft to the base plate assembly.
5. Apply a thin film of grease to the shaft using a cotton-tipped applicator or fingertip.
6. Move the slide arm to allow grease to spread to both ends of the left and right sides of the shaft.
7. Install the push bar shaft.

   Refer to *Replacing the Push Bar*, page 4-10.
8. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
9. Turn on the analyzer and enter the Factory Test Mode.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.

10. Select **INSTRUMENT TEST**.
11. Select **EXERCISE ALL MOTIONS**.

    Refer to *Using the Exercise All Motions Test*, page 4-52.

    Cycle the motions 10 times to work the grease in.

Repair and Service

This section contains instructions for servicing the Clinitek Advantus analyzer. Always perform the preventive maintenance procedures in *Cleaning and Preventive Maintenance*, page 4-1, when servicing this analyzer.

Perform the *Service Release Testing*, page 4-61 prior to returning the analyzer to the customer for use.

You need the following tools to perform repair and service:

- #1 and #2 Phillips screwdrivers or bits
- #1 Phillips right angle screwdriver
- T-8 Torex driver or bit
- Torque driver capable of torquing the Phillips and T-8
- Small flatblade screwdriver
- 0.050-inch Hex wrench
- 5/64-inch Hex wrench
- Digital Multi-Meter (DVM)
- Clean, cotton gloves

Replacing Parts

Most of the assembly and disassembly information you need for the Clinitek Advantus Analyzer is in the Clinitek Advantus Operator's Guide. For information about locating necessary assembly instructions, refer to the following table:

Assembly	Location
Printer	*Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, page 48
Fixed Platform	Performing the Daily Cleaning in the *Clinitek Advantus Operator's Guide*, page 37
Moving Table	Performing the Daily Cleaning in the *Clinitek Advantus Operator's Guide*, page 37
Push bar	*Replacing the Push Bar*, page 4-10
MMC Program Card	*Installing the MMC Program Card*, page 4-11

Assembly	Location
Upper Case	*Removing the Upper Case*, page 4-11
Display Bezel	*Replacing the Display Bezel*, page 4-12
Main PCB	*Replacing the MAIN PCB*, page 4-14
LCD Touchscreen	*Replacing the LCD Touchscreen*, page 4-17
Fan Assembly	*Replacing the Fan Assembly*, page 4-18
Internal Printer Interface PCB	*Replacing the Internal Printer*, page 4-19
Table Guide-Left	*Replacing the Table Guide-Left*, page 4-21
Table Guide-Right	*Replacing the Table Guide-Right*, page 4-23
Power Supply	*Replacing the Power Supply*, page 4-26
Electronics Bracked	*Replacing the Electronics Bracket*, page 4-28
MOTHER PCB	*Replacing the MOTHER PCB*, page 4-31
Strip Detector	*Replacing the Strip Detector*, page 4-34
Lamp Assembly	*Replacing the Lamp Assembly*, page 4-36
A/D PCB and Pre-Amp PCB	*Replacing the A/D PCB and Pre-AMP PCB*, page 4-38
Drive Housing	*Replacing the Drive Housing*, page 4-41
Crank Arm	*Replacing the Crank Arm*, page 4-44
Baseplate Mechanism	*Replacing the Baseplate Mechanism*, page 4-45
Lower Case	*Removing the Lower Case*, page 4-47
Power Entry Module and Power Switch	*Replacing the Power Entry Module and Power Switch*, page 4-49

Replacing the Push Bar

You do not need any special tools to perform this procedure.

Removing the Push Bar

The push bar is located on the left front side, above the fixed platform, mounted horizontally.

Grip the push bar and pull up and out to disengage it from the push arm slide.

Installing the Push Bar

While holding onto the finger grip end of the push arm, slide the tab end into the push bar slide hole at a slight upward angle.

Installing the MMC Program Card

CAUTION: Do not remove or install the MMC program card with the power on. This may result in loss of data in the SRAM.

NOTE: This card is only required for software updates and is not required to remain in the analyzer for normal operations. Therefore, this procedure is only for updating or reloading software into the analyzer.

You do not need any special tools to perform this procedure.

The MMC program card slot is located on the right back corner of the display assembly.

1. With the analyzer power off, remove the gray plastic dust cover from the slot by pulling and rotating the top edge downward.

   The bezel assembly retains the cover.

2. Insert the MMC program card face down into the slot, with the contacts facing up and toward the front of analyzer and the notch to the right.

   Insert the card fully until you hear the click of the ejection mechanism.

Removing the MMC Program Card

To remove the MMC program card, perform the following steps:

1. Turn the analyzer power off.
2. Push in on the MMC program card to activate the ejection mechanism.

   You hear a click and the card is pushed out slightly by an internal spring.

3. Replace the gray plastic dust cover by pushing it back into the card opening.

Removing the Upper Case

You need a #2 Phillips screwdriver for M4 screws to perform this procedure.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

To remove the upper case, perform the following steps:

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

3. Remove the 4 Phillips screws that secure the upper case to the frame.

Two screws are in the back of the upper case, 1 in the front lower left corner and 1 screw, recessed, in front of the printer.

4. Lift the upper case and tilt it toward the back of the analyzer to gain access to the display/MAIN PCB interconnectivity ribbon cable and display/MAIN PCB power.
5. Disconnect the interconnectivity ribbon cable from the upper connector (PL2) on the data interconnect back board that is mounted on the electronics bracket.
6. Disconnect the power cable from the MOTHER PCB (PL14).
7. Remove the upper case.

Installing the Upper Case

1. Set the upper case onto the analyzer with it tilted to the back.
2. Plug the display/MAIN PCB power cable assembly into the MOTHER PCB (PL14).
3. Plug the display/MAIN PCB interconnectivity ribbon cable into the data interconnect back board (PL2).
4. Tilt the upper case forward and properly align the case for assembly.
5. Install the 1 Phillips screw that secures the lower front left corner of the upper case to the frame and the screw in front of the printer.
6. Install the 2 Phillips screws that secure the back of the upper case to the frame.
7. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
8. Install the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Display Bezel

You need a #2 Phillips screwdriver to perform this procedure.

Removing the Display Bezel

To disassemble the display bezel assembly, perform the following steps:

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Turn the upper case over and locate the 2 bezel assembly retaining clips.

   Place the case with the fan holes facing down.

5. Using a small flatblade screwdriver, lift one of the retaining clips.

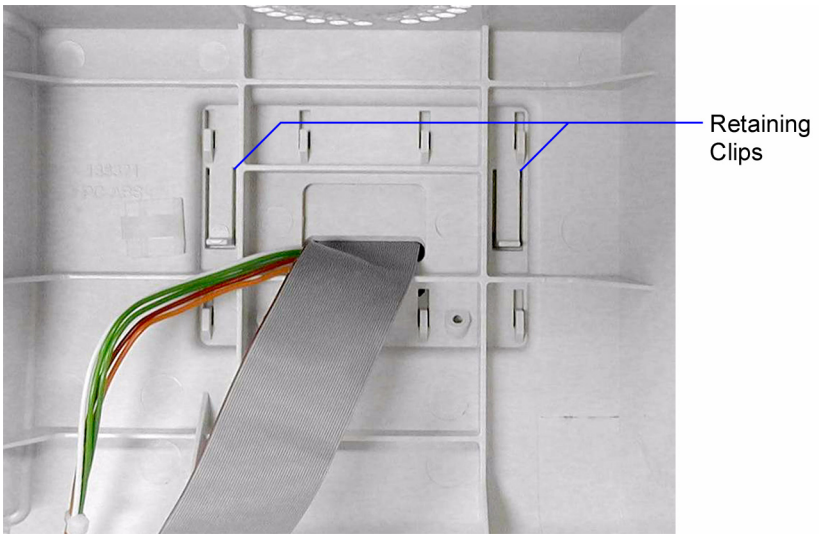


Figure 4-5 Upper Case – Underside View

6. Push that edge of the bezel assembly down.
7. While holding the assembly down, use the flat head screwdriver and lift the remaining retaining clip.

   The display bezel assembly should now slide off of the upper case.

Installing the Display Bezel

To reassemble the display bezel assembly, perform the following steps:

1. Place the upper case in the upright position.
2. Route the display bezel assembly cables through the opening in the upper case.
3. Position the display bezel assembly so that it is facing the front of the upper case and snap into place by sliding forward.

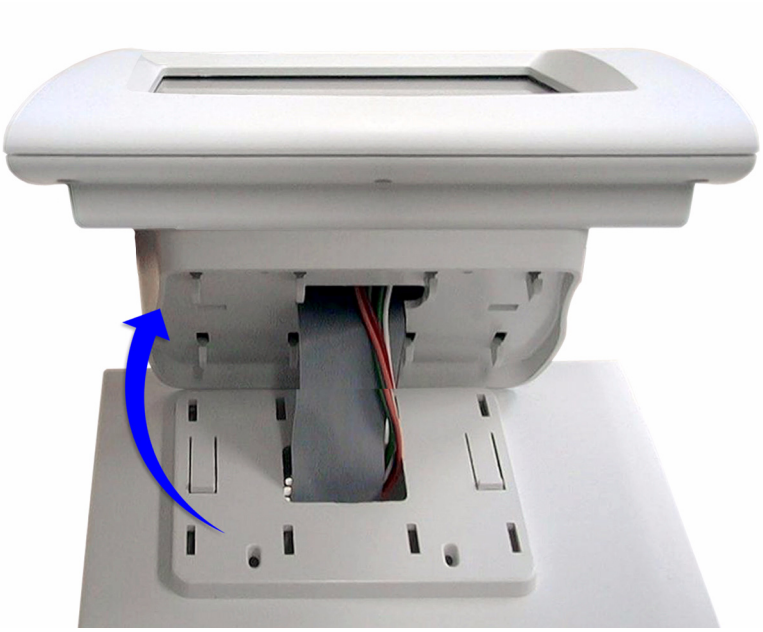


Figure 4-6 Bezel Assembly

4. Rotate the bezel backward until the back tabs engage.
5. Connect the data interconnect ribbon cable to the data interconnect back board.
6. Connect the display/MAIN PCB to the MOTHER PCB PL14.
7. Install the upper case, including the fixed platform and printer.

   Refer to *Installing the Upper Case*, page 4-12.

Replacing the MAIN PCB

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver

Removing the Main PCB

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11

4. Remove the display bezel assembly.

   Refer to *Replacing the Display Bezel*, page 4-12.

5. Remove the 6 Phillips screws holding the display bezel assembly together.

   Because of the tight working area, disconnect the interconnection ribbon cable from the MAIN PCB before releasing the ferrite shield.

6. Disconnect the data interconnection ribbon cable from the MAIN PCB, PL5.
7. Release the large ferrite shield around the data interconnection ribbon cable by releasing the catch on the side and removing the ribbon cable.
8. Disconnect the power cable assembly from the MAIN PCB, PL6.
9. Disconnect the LCD back light power, PL7.
10. Disconnect the small touchscreen flex cable from PL2.

    Pull out the white retaining bar to unlock the connector.

11. Disconnect the LCD display control line form PL8.

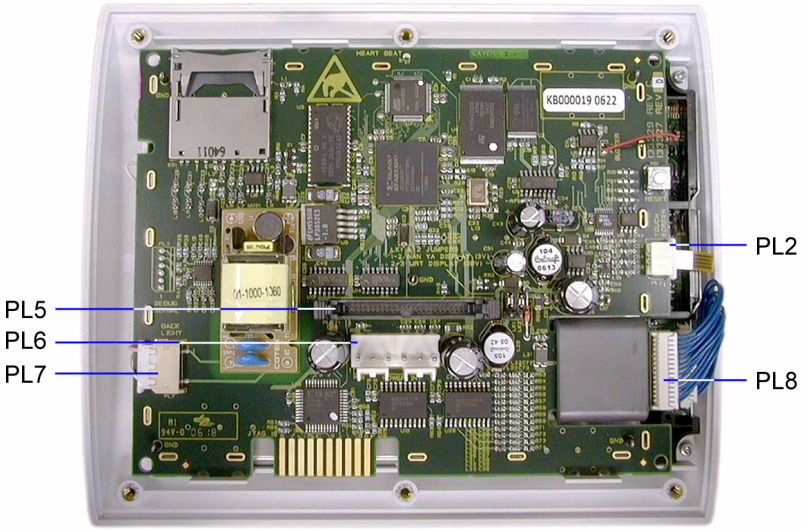


Figure 4-7 MAIN PCB

12. Release the Main PCB:

a. Hold the display assembly in both hands with the MAIN PCB facing you.
b. Use your index fingers to gently push the MAIN PCB down and your thumbs to push up on the plastic retaining clips along the top edge of the PCB to release the MAIN PCB.

13. Pull the buzzer from the back of the display module.

    Use a small flatblade screwdriver to remove the buzzer.

Installing the Main PCB

1. Place the display assembly face down with the top logo facing away from you on a clean, soft cloth, or working surface.
2. Affix the buzzer to the back of the display case using the double-sided adhesive tape.
3. Place the bottom 2 retaining board extensions into the 2 lower retaining clips.
4. Snap the upper 2 board extensions into the upper 2 retaining clips.

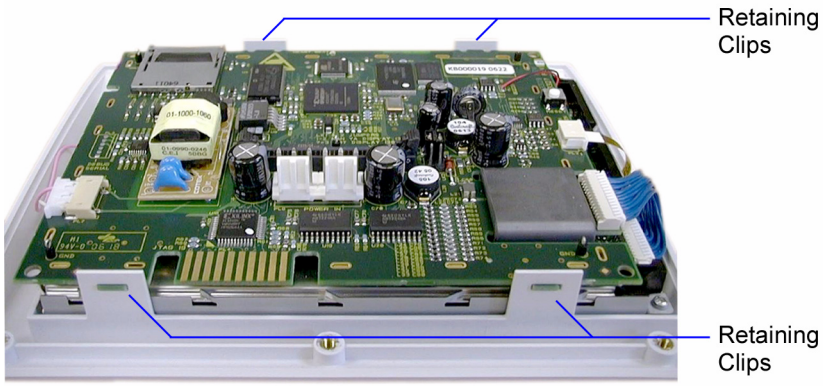


Figure 4-8 Display Assembly Retaining Clips

5. Connect the LCD display cable assembly into PL8.
6. Connect the touchscreen flex cable into PL2.

   Make sure the connector is unlocked before inserting the flex cable and then lock it in place once you insert it.
7. Connect the back light power leads into PL7.
8. Insert the data interconnection ribbon cable through the opening in the back of the back display case and through the large ferrite shield.

   NOTE: Do not close the ferrite shield.
9. Insert the power cable assembly through the opening on the back of the back display case.
10. Position the back case of the display over the front case.

Ensure the orientation is correct.

11. Connect the data interconnection ribbon cable assembly to the MAIN PCB, PL8.
12. Connect the power cable assembly to the MAIN PCB, PL6.
13. Set the display back case in place.
14. Gently pull the data interconnection ribbon cable assembly out the back of the case making sure not to pull it out of the ferrite shield.
15. Using your finger, reach in through the back opening of the case and snap the shield closed.
16. Screw the back of the display case to the front of the display using the 6 Phillips screws.
17. Install display bezel assembly.

    Refer to *Replacing the Display Bezel*, page 4-12.
18. Install the upper case.

    Refer to *Removing the Upper Case*, page 4-11.
19. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
20. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the LCD Touchscreen

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for the M4 screws
- #1 Phillips screwdriver
- Torque Driver

Removing the LCD Touchscreen

1. Remove the display bezel assembly.

   Refer to *Replacing the Display Bezel*, page 4-12.
2. Place the bezel assembly face down on a work surface.
3. Disconnect the touchscreen flex cable from the display interface PCB.
4. Remove the 4 screws that secure the LCD touchscreen assembly to the bezel.
5. Remove the LCD touchscreen assembly.
6. Separate the touchscreen from the display.

Installing the LCD Touchscreen

1. Clean the display.
2. Remove the protective backing from the new touchscreen.
3. Position the touchscreen into the bezel.
4. Position the display into the bezel.
5. Install the display mounting bracket.

   Tighten the 4 screws to a torque of 7 inch-pounds.
6. Reconnect the touchscreen flex cable to the display interface PCB.
7. Install the display bezel assembly.

   Refer to *Installing the Display Bezel*, page 4-13.
8. Install the Instrument Test card and verify operation of the Display and Touchscreen.

   Refer to *Using the Test Touchscreen Option*, page 4-57 and *Using the Test Display Option*, page 4-58.

Replacing the Fan Assembly

You need the following tools for this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver for all remaining

Removing the Fan Assembly

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11
2. Disconnect the fan power cable from the power supply cable assembly.

   The connector is part of the cable assembly.
3. While holding the fan, remove the 4 screws mounting the fan to the electronics bracket.

Installing the Fan Assembly

1. Install the fan on the inside on the electronics bracket.

   Ensure the fan is on the same side as the data interconnect back board with the manufacturer name and model number facing so that it can be read from the back of the analyzer.
2. Situate the fan cable assembly so that it is in the upper left corner of the fan.

3. Install one of the 4 Phillips screws through the upper left corner of the electronics bracket and attach them to the fan.
4. Install the mounting screws.
5. Connect the fan power cable to the power supply cable assembly fan connector.
6. Install the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

Replacing the Internal Printer

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Torque Driver

Removing the Internal Printer

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
4. Remove the display bezel assembly.

   Refer to *Replacing the Display Bezel*, page 4-12.
5. Disconnect the printer interface power cable assembly from MOTHER PCB, PL6.
6. Disconnect the printer interface data flex cable from MOTHER PCB, PL3.

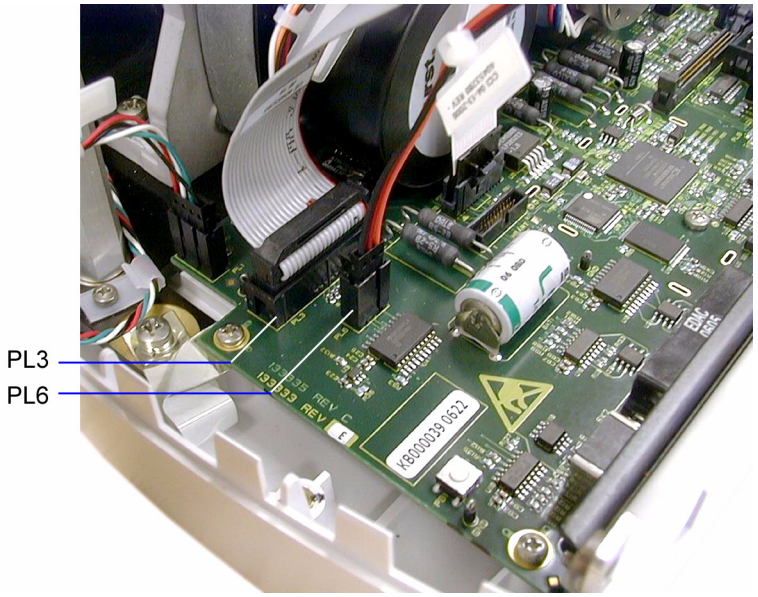


Figure 4-9 MOTHER PCB

7. Remove the 2 screws holding the printer interface PCB to the printer support bracket.

Installing the Internal Printer

1. Install the new printer interface PCB assembly to the printer support bracket making sure to position the insulator between the PCB and the support bracket.
2. Secure with the 2 Phillips screws.
3. Tighten the screws to a torque of 5 inch-pounds.
4. Connect the printer interface data flex cable to the MOTHER PCB, PL3.
5. Connect the printer interface power cable assembly to the MOTHER PCB, PL6.
6. Install display bezel assembly.

   Refer to *Installing the Display Bezel*, page 4-13.
7. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
8. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
9. Install the printer.

Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Table Guide-Left

You need the following tools:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver

Removing the Table Guide-Left

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

⚠ **CAUTION**: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to in *Removing the Upper Case*, page 4-11.

4. Remove the 3 screws that secure the table guide to Mounting Plate: 2 on the left side, 1on the right side.

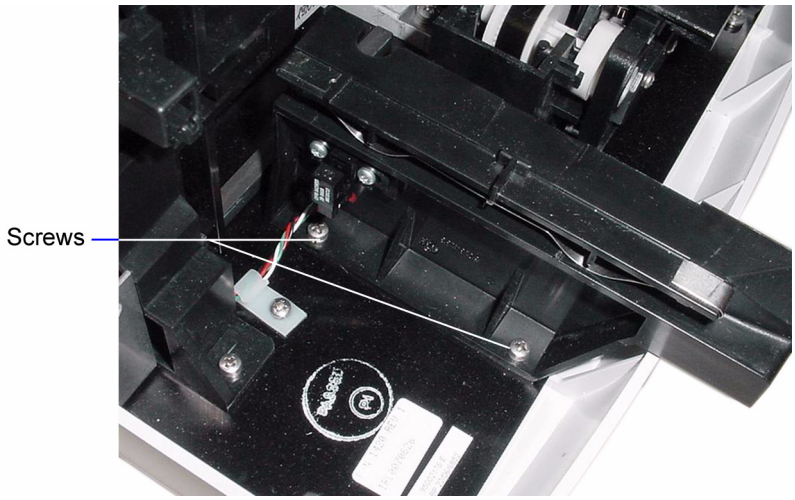


Figure 4-10 Clinitek Advantus Left Table Guide, left screws

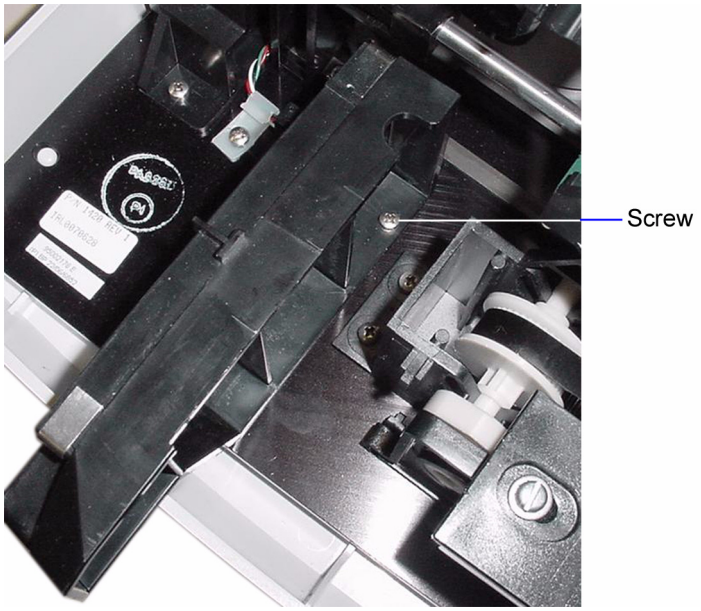


Figure 4-11 Clinitek Advantus Left Table Guide, right screw

5. Disconnect the strip detector data flex cable (PL11) to gain access to the sensor connector PL8.
6. Disconnect the optical sensor connector from the MOTHER PCB, PL8.
7. Remove the table guide.

Installing the Table Guide-Left

1. Position the table guide onto analyzer Baseplate using the locating pins on the guide.
2. Secure the table guide to the Mounting Plate, 2 screws on left side and one on right.
3. Connect the optical sensor connector to PL8 on the MOTHER PCB.

   The sensor wire should go between the push bar rail support and the push bar slide. Secure the wires with the 2 plastic clips. Check that no interference with the push bar exists.
4. Reconnect the strip detector Data flex cable to PL11.
5. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
6. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
7. Install the printer.

Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Table Guide-Right

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver

Removing the Table Guide-Right

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Remove the 3 Phillips screws that secure the right table guide to the Mounting Plate: 2 on the left side, 1 on the right side.

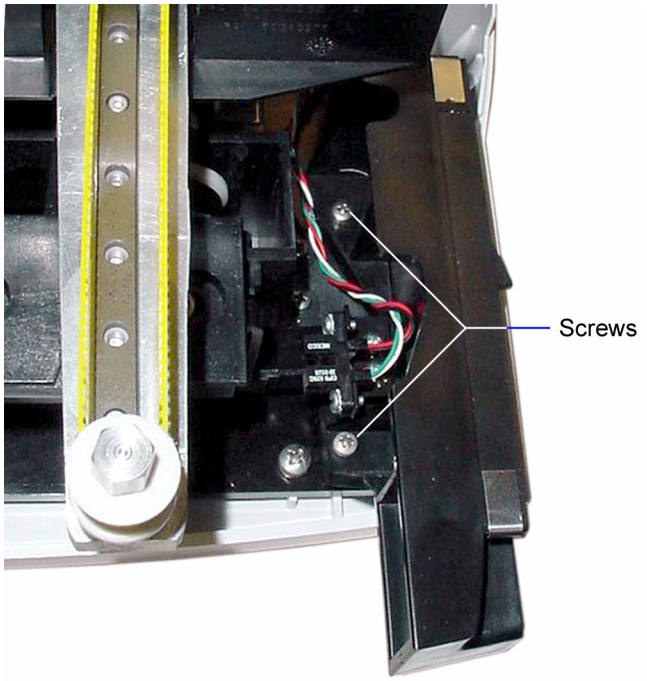


Figure 4-12 Clinitek Advantus Right Table Guide, left screws

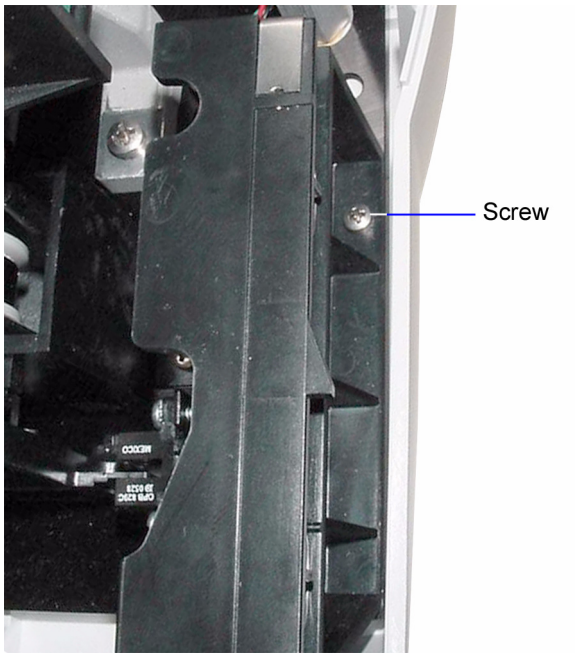


Figure 4-13 Clinitek Advantus Right Table Guide, right screw

Move the readhead carrier assembly toward the back of the analyzer for access to the front screw and move it to the front of the analyzer for access to the back screws.

5. Disconnect the cable coming from the table sensor going to the MOTHER PCB connector PL1.
6. Remove the table guide.

Installing the Table Guide-Right

1. Position the table guide on the Baseplate using the pins on the Table guide.
2. Reconnect the table sensor cable to connector PL1 on the MOTHER PCB.
3. Secure the table guide to the Mounting Plate, 2 screws on left side and one on right.
4. Connect the optical sensor connector to PL8 on the MOTHER PCB.

   The sensor wire should go between the Push Bar Rail Support and the Push Bar Slide.

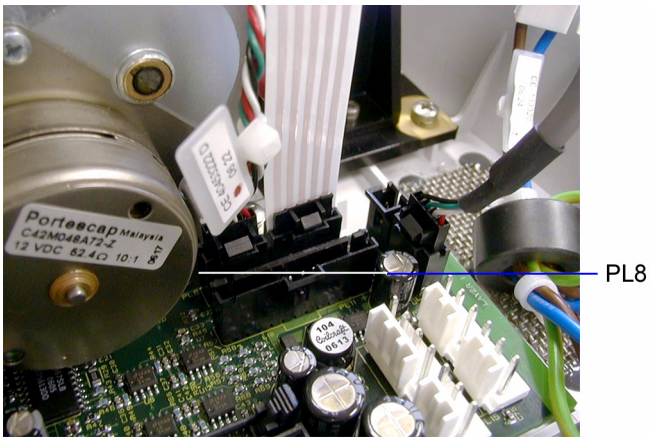


Figure 4-14 MOTHER PCB at PL8

5. Secure the wires with the 2 plastic clips.

   Check that there is no interference with the Push Bar.
6. Reconnect the strip detector Data flex cable to PL11.
7. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
8. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
9. Install the printer.

Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Power Supply

You need the following tools for this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Torque Driver

Removing the Power Supply

1. Remove the printer

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Disconnect the Power Supply cable going to the MOTHER PCB (PL15).
5. Disconnect the fan power cable from the Power Supply cable.
6. Remove the Phillips screw that connects the grounding wire from the Power Entry Module to the left, lower side of the Power Supply.
7. Loosen the 3 electronics bracket mounting screws.

   These screws are spring loaded and are retained with the Bracket assembly. Refer to *Replacing the Electronics Bracket*, page 4-28.

8. Tilt the electronics bracket to the back to allow for the disconnection of the data interconnection ribbon cable from the MOTHER PCB PL13.
9. Lift out the electronics bracket to gain access and disconnect the Power Entry Module / Power Switch from the Power Supply.

   You may need a small flatblade screwdriver to release and remove the retaining clip on the connector.

10. With the electronics bracket removed, remove the 4 Phillips screws that hold the Power Supply to the Electronic Mounting Bracket.

Installing the Power Supply

1. Place the Power Supply into the left, outside face of the electronics bracket.

   The component side faces left with output connector, J10, at the top.

Figure 4-15 Electronics Bracket

2. Install the 4 Phillips mounting screws to secure the Power Supply to the electronics bracket.
3. Lower the electronics bracket assembly back in place in the analyzer and lift up the left edge to connect the Power Entry Module / Power Switch to the Power Supply SK1.
4. Tilt the electronics bracket to the back to connect the data interconnection ribbon cable to the MOTHER PCB PL13.

5. Install the Phillips screw that holds the Ground wire from the Power Entry Module to the lower left side of the Power supply.

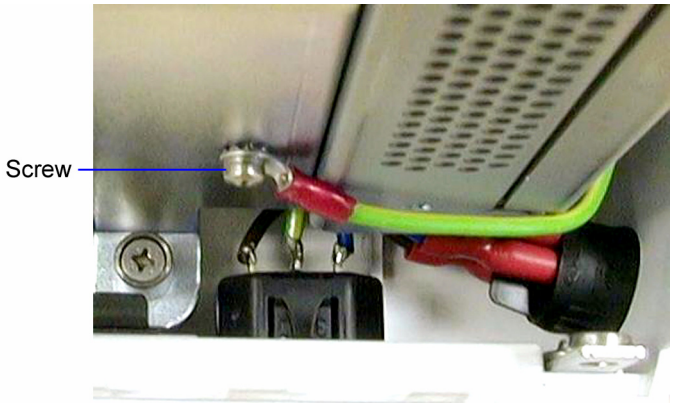


Figure 4-16 Ground Wire

6. Tighten the 3 electronics bracket mounting screws.
7. Connect The Power Supply connector J10 to the connector PL15 on The MOTHER PCB.
8. Connect the fan power cable to the Power supply cable assembly.
9. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
10. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
11. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Electronics Bracket

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver for all remaining
- Small flat-blade screwdriver
- Torque Driver

Removing the Electronics Bracket

1. Remove the printer.

Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

⚠ **CAUTION**: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11

4. Disconnect the Power Supply cable assembly from the MOTHER PCB PL15.
5. Remove the Ground wire leading from the Power Entry Module / Power Switch from the back side of the electronics bracket.

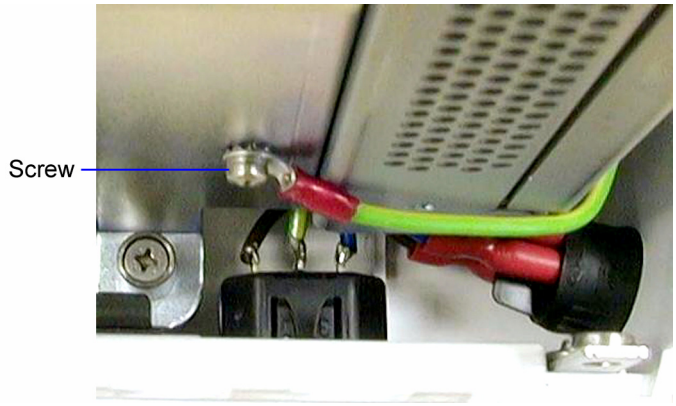


Figure 4-17 Ground Wire

6. Loosen the 3 electronics bracket mounting screws.

   These screws are spring loaded and are retained with the Bracket assembly.

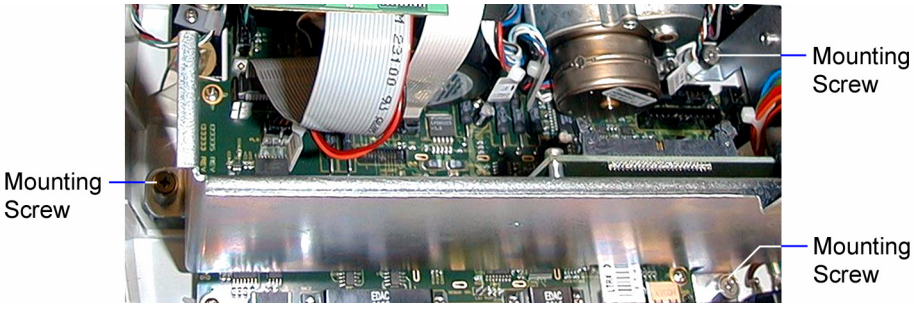


Figure 4-18 Electronic Bracket Mounting Screws

7. Tilt the electronics bracket to the back to allow for access and disconnection of the data interconnection ribbon cable from the MOTHER PCB PL13.
8. Lift out the electronics bracket so that you can gain access and disconnect the Power Entry Module / Power Switch from the Power Supply.

   You may need a small flat blade screwdriver to release the retaining clip on the connector to allow for its removal.
9. Remove the electronics bracket assembly.

Assembling the Electronics Bracket

1. Set the electronics bracket assembly in place.

CAUTION: Do not pinch wires or bend any pins.

2. At the back of the analyzer, reconnect the grounding strap from the power supply to the Baseplate on right side.
3. Connect the main power ground wire to the bracket next to the main power and tighten the screw to a torque of 5 inch-pounds.
4. Connect the main power cable to the Power Supply input connector and the power cable going to the MOTHER PCB to the Power Supply output connector.
5. Reconnect the power cable for the printer interface PCB to connector P7 on the MOTHER PCB.
6. Tighten the 2 screws on the right side.
   a. One screw is at the right back of the bracket, next to the main power plug.
   b. The second screw is located next to the Power Supply on the inside.
7. From the back of the analyzer, install the one screw on left side securing the bracket to the lower case.

   This screw goes through a grounding strap.
8. Reconnect the cables going to the Main Processor PCB from the strip detector (J6) and the A/D PCB (J2).
9. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
10. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
11. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the MOTHER PCB

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Torque Driver
- New conductive gasket (PN 50184582)

Removing the MOTHER PCB

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

⚠ **CAUTION**: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Remove the electronics bracket.

   Refer to *Replacing the Electronics Bracket*, page 4-28.

5. Disconnect cables in the following order:
   a. strip detector data flex cable from PL11
   b. strip detector power flex cable from PL9
   c. printer interface power cable from PL6
   d. printer interface flex cable from PL3
   e. A/D Pre-Amp PCB flex cable from PL10

6. Disconnect the optical sensors and motors from the MOTHER PCB in the following order:
   a. fixed platform sensor, PL8
   b. crank arm sensor, PL12
   c. push bar motor, PL5
   d. readhead drive motor, PL2
   e. moving table motor, PL4
   f. moving table sensor, PL1

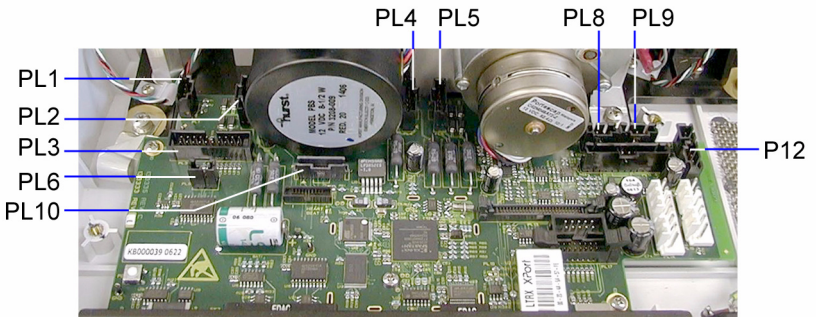


Figure 4-19 MOTHER PCB

7. Remove the Baseplate assembly.

   Refer to *Removing the Baseplate Mechanism*, page 4-45.
8. Remove the 6 screws securing the MOTHER PCB to the lower case.
9. Remove the 3 back screws securing the MOTHER PCB back plate to the back of the lower case.

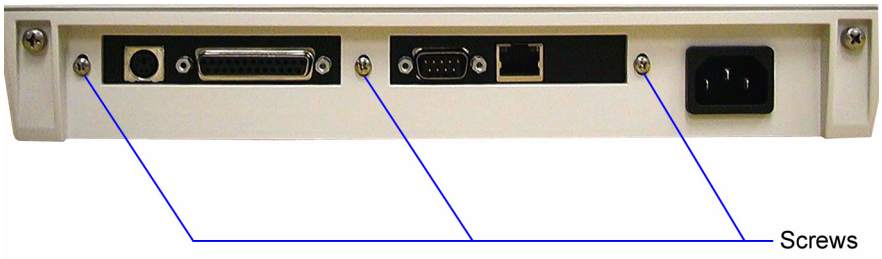


Figure 4-20 Lower Case – Back View

10. Remove the MOTHER PCB inward, allowing enough room for the DB9 Serial connector and external printer connector (DB25) on the PCB to miss the outer edge of the lower case.
11. Gently lift the back of the PCB upward and out to remove it.

12. Remove the conductive gasket between the back plate of the MOTHER PCB and the inside back wall of the lower case.

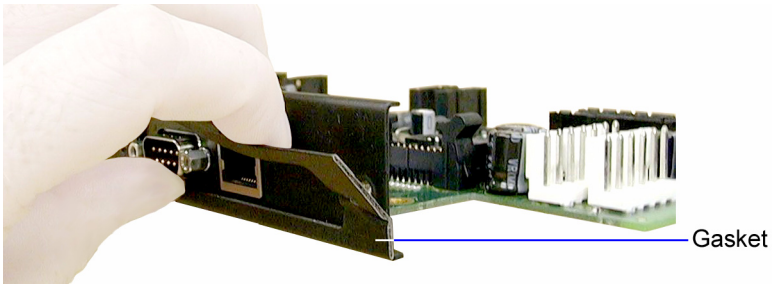


Figure 4-21 Conductive Gasket

Installing the MOTHER PCB

1. Install a new conductive gasket.

   This goes between the back inner lower case wall and the back of the MOTHER PCB.

2. Position the MOTHER PCB onto the lower case and insure that gasket is in proper position.
3. Install the 6 screws securing the MOTHER PCB to the lower case.
4. Install the 3 back screws securing The MOTHER PCB back plate to the back of the lower case.

   Tighten the screws to a torque of 7 inch-pounds.

5. Install the Baseplate assembly, section 9-22.
6. Connect the optical sensors and motors to the MOTHER PCB in the following order:
   a. fixed platform sensor, PL8
   b. crank arm sensor, PL12
   c. push bar motor, PL5
   d. readhead drive motor, PL2
   e. moving table motor, PL4
   f. moving table sensor, PL1
7. Connect the cables in the following order:
   a. strip detector power flex cable to PL9
   b. strip detector data flex cable to PL11
   c. printer interface flex cable to PL3
   d. printer interface power cable to PL6
   e. A/D Pre-Amp PCB flex cable to PL10

8. Install the electronics bracket.

   Refer to *Replacing the Electronics Bracket*, page 4-28.

9. Install the upper case.
10. Refer to *Installing the Upper Case*, page 4-12.
11. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

12. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Strip Detector

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver for all remaining
- Right angle #1 Phillips screwdriver

Removing the Strip Detector

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Disconnect the strip detector flex cable from PL11 on the MOTHER PCB.
5. Disconnect the strip detector power flex cable from PL9 on the MOTHER PCB.
6. Using a right angle Phillips screwdriver, remove the 2 Phillips screws holding the strip detector Bracket to the casting.

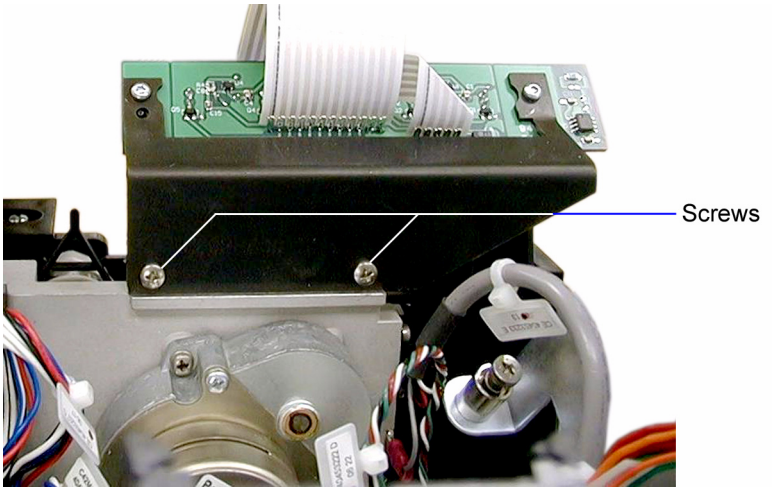


Figure 4-22 Strip Detector Bracket

NOTE: An alternative to removing the bracket is to remove the strip detector PCB from the bracket by removing the 2 T-8 Torex head screws that secure it to the Bracket.

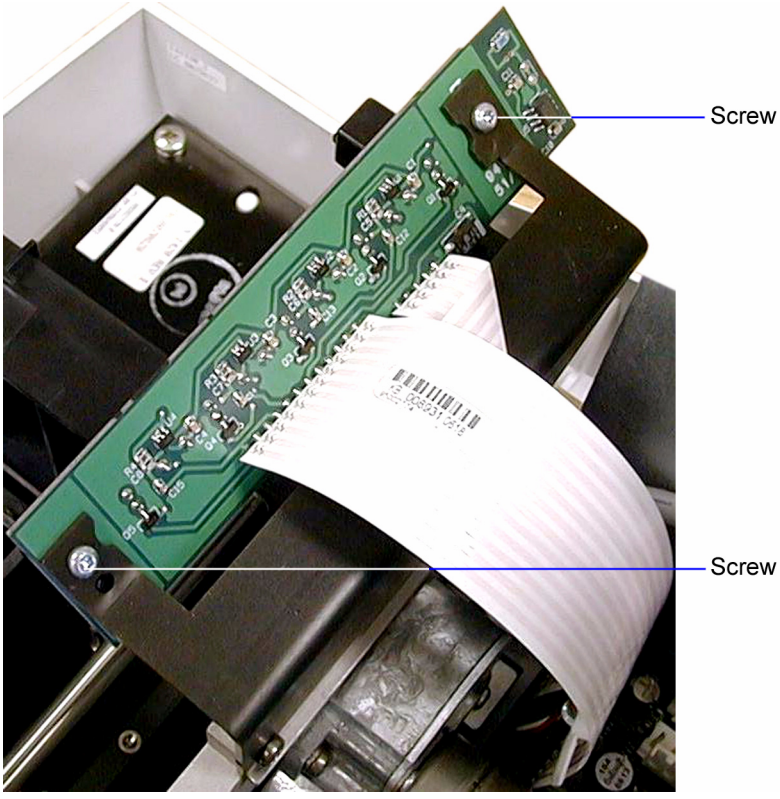


Figure 4-23 Strip Detector PCB and Bracket

7. Remove the strip detector assembly.

Installing the Strip Detector

1. Install the strip detector assembly with the flex cable at the bottom of strip.

   The bracket must fit in to the ledge on the casting. The strip detector housing assembly, the black piece covering detectors, is keyed at one end.
2. Install the 2 Phillips screws holding the strip detector Bracket to the casting.
3. Connect the 5-pin strip detector power flex cable to PL9 on the MOTHER PCB.

   NOTE: For ease of connecting other cables, connect the 5-pin flex cable first.
4. Connect the 12-pin strip detector flex cable to PL11 on the MOTHER PCB.
5. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
6. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
7. Install the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Lamp Assembly

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Cotton gloves

Removing the Lamp Assembly

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

Refer to *Removing the Upper Case*, page 4-11.

CAUTION: Do not handle lamps without gloves. You must wear clean white cotton gloves when handling the Preamp PCBs A/D PCB or Lamps. A dirty Preamp PCB can cause errors 02-1 and 02-2.

4. Disconnect P4, right lamp assembly, and P5, left lamp assembly, from the Pre-AMP

   A/D PC assembly.

   Both lamps have a plastic lamp-securing arm.

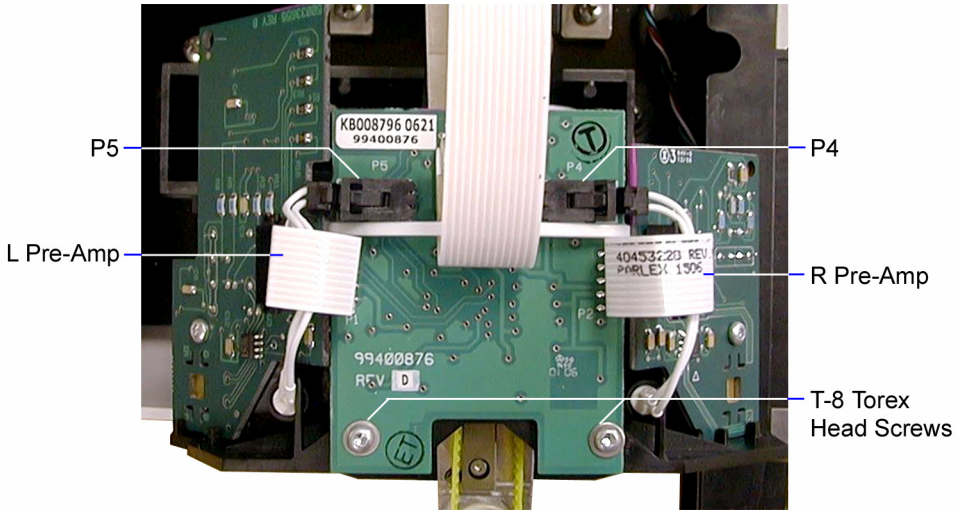


Figure 4-24 Lamp Assembly

5. To remove the lamp, gently pull the locking arm away from the lamp until the lamp clears the arm.
6. Remove the lamp.

Assembling the Lamp Assembly

NOTE: Replace the lamps in pairs.

CAUTION: Do not handle lamps without gloves. You must wear clean white cotton gloves when handling the Preamp PCBs A/D PCB or Lamps. A dirty Preamp PCB can cause errors 02-1 and 02-2.

1. Pre-clean the lamps with isopropyl alcohol and allow them to air dry before installing them into the instrument.
2. Install the lamp assembly:

   Both lamps have a plastic locking arm to secure them in place.

a. Gently pull the locking arm way from the lamp holder.
b. Insert the lamp.

3. Route the lamp cables under the Pre-Amp flex cables and ensure that plugs P5 and P6 lock into the mating connectors on the A/D PCB.
4. Check that neither the flex cables nor the lamp cables come in contact with the inside of the hood area of the upper case.
5. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
6. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.
7. Install the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the A/D PCB and Pre-AMP PCB

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- T-8 Torex driver
- Cotton gloves

Removing the A/D PCB

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

CAUTION: Do not handle lamps without gloves. You must wear clean white cotton gloves when handling the Preamp PCBs A/D PCB or Lamps. A dirty Preamp PCB can cause errors 02-1 and 02-2.

4. Disconnect P4, right lamp assembly, and P5, left lamp assembly, from the Pre-AMP A/D PC assembly.

   Both lamps have a plastic securing arm.

5. Remove the lamps:

   a. Gently pull locking arm away from lamp until the lamp clears the arm.

   b. Remove the lamps.

      Refer to Figure 4-24 *Lamp Assembly*.

6. Disconnect the flex cable from PL10 on the MOTHER PCB.

7. Disconnect the flex cables from the left and right Pre-AMP PCBs.

   Lifting the outer housing of the ZIF connector unlocks the housing allowing the flex cable to be removed.

8. Remove the 2 T-8 Torex screws securing the Pre-AMP A/D Interconnect PCB to the readhead carrier assembly.

Installing the A/D PCB

1. Set the Pre-AMP A/D on top of readhead carrier assembly and align the screw holes.

2. Install the 2 T-8 Torex screws securing the Pre-AMP A/D to the readhead carrier assembly and tighten to a torque of 7 inch-pounds.

3. Route the 12-pin flex cable through the opening in the back of the printer Mounting Bracket and connect the flex cable to PL10 on the MOTHER PCB.

4. Install the 2 Lamp Assemblies.

5. Refer to *Replacing the Lamp Assembly*, page 4-36.

6. Connect the lamp connectors P4 and P5 to Pre-AMP A/D Interconnect PCB assembly.

7. Install the Flex cables into the ZIF connector on the Pre-AMP PCBs and push the connector locking bar down to secure the flex cables.

8. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.

9. Install the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

10. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Pre-AMP PCBs

NOTE: It is easier to remove and install the Pre-AMP PCBs with the A/D PCB removed.

You need the following tools for this procedure:

- Torque Driver

Removing the Pre-AMP PCBs

CAUTION: Do not remove or install the screw securing the Pre-amp PCBs. This screw supports the Readhead Carrier Assembly. It must be supported from underneath to prevent it from breaking.

The Pre-AMP PCBs are attached to the black plastic readhead carrier assembly by one screw and 2 tabs molded into the readhead.

Removing the screw allows the Pre-AMP PCBs to be separated from the readhead carrier assembly.

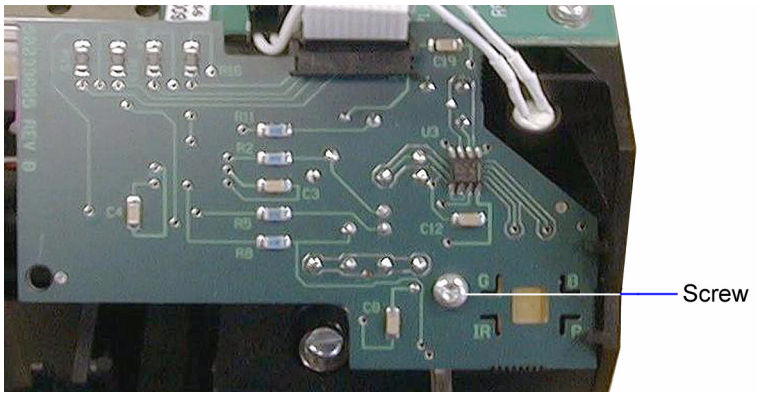


Figure 4-25 Left Pre-Amp PCB

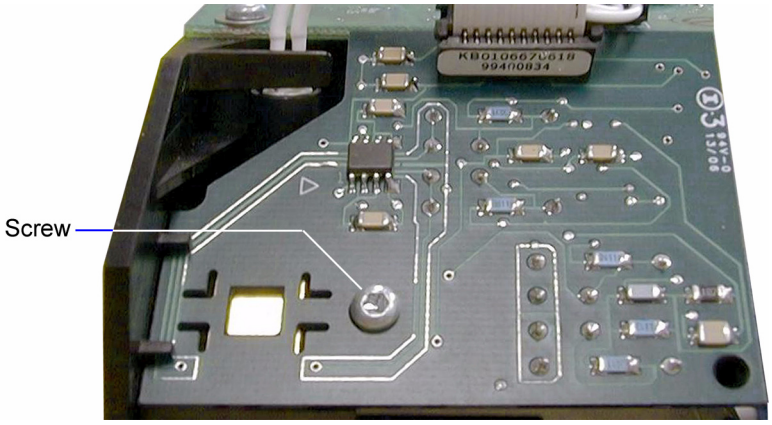


Figure 4-26 Right Pre-AMP PCB

Installing the Pre-AMP PCBs

1. Move the readhead carrier assembly to the front of the analyzer.
2. Position the Pre-AMP PCB in place and fasten with the T-8 Torex head screw.
3. Tighten the T-8 Torex screw to a torque of 7 inch-pounds.

   NOTE: Make sure that the left Pre-AMP PCB does not droop. If the back of the PCB hangs down, it may make contact with the slide arm. For information on the Baseplate assembly, refer to *Parts and Schematics*, page 5-1.

4. Reconnect the flex cables coming from the A/D PCB and continue with the assembly procedure for the A/D PCB from *Installing the A/D PCB*, page 4-39.

   NOTE: You may find it easier to install the flex cables from the A/D PCB into the Pre-AMPs before installing any of the PCBs onto the readhead carrier assembly. You can then install the 3 PCB assemblies starting with the left Pre-AMP, next the A/D PCB and finishing with the right Pre-AMP PCB.

Replacing the Drive Housing

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Hex wrench, 5/64-inch

Removing the Drive Housing

1. Remove the printer.

Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Remove the left table guide assembly.

   Refer to *Replacing the Table Guide-Left*, page 4-21.

5. Move the readhead carrier assembly to the back position on the analyzer.
6. Remove the 2 Phillips screws securing the drive housing on the left and 2 screws on right.
7. Disconnect the optical sensor from PL1 on the MOTHER PCB.

   A flexible coupling connects the drive housing assembly to the stepper motor shaft.

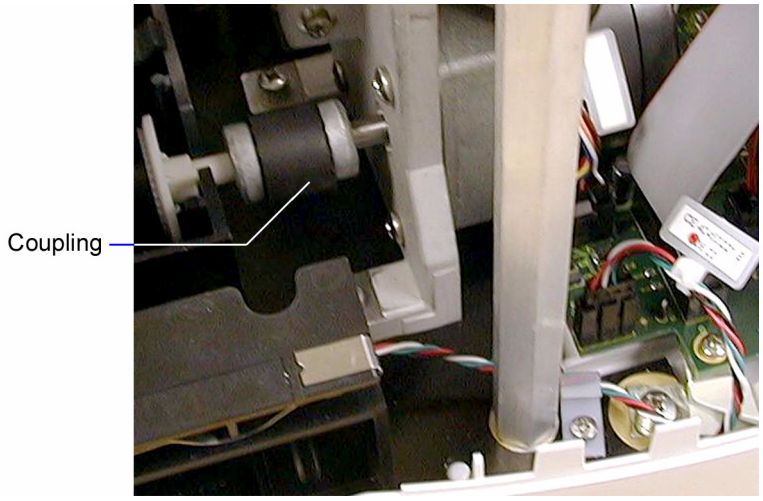


Figure 4-27 Drive Housing with Coupling

8. If it is necessary to loosen one half of the flexible coupling to remove the drive housing assembly, perform the following steps:
   a. Rotate the coupling so that the setscrews are at the 1 o'clock position.
   b. Use a 5/64-inch Hex wrench to loosen the setscrew of the coupling on the shaft coming from the drive housing assembly.

c. Slide that half of the coupling towards the drive housing assembly on the shaft.

CAUTION: Do not use the front rotating plate of the drive housing for lifting the housing. This could deform the housing. Use the sides of the drive housing.

d. Gently lift the housing upward to disengage the 2 pins that key the housing into the baseplate.

   The pins are on the bottom of the drive housing assembly.

9. Gently lift the left side of the housing upward until you feel the left tab come out of the Baseplate hole.
10. Holding the left side of the housing with your left hand, place your right hand on the right side of the housing.
11. Gently lift upward with your right hand while gently twisting upward with your left hand.
12. Remove the housing and guide the optical sensor cable through the hole in the right table guide.

Installing the Drive Housing

1. Guide the optical sensor wire through the hole in the side of the right-hand table guide directly above the screws holding the sensor onto the table guide.
2. Slide the housing gear into the flexible coupling.

CAUTION: Do not push on the moving table plate.

3. Holding the left side of the housing with your left hand, push on the right side of the housing until the right tab falls into the Baseplate positioning hole.
4. When the right side is in, push on left side of housing until you feel the left side fall into position.
5. Center the table sensor flag between the sensor arms.
6. Connect the sensor wire into PL1 on the MOTHER PCB.
7. Install the 2 Phillips screws securing the drive housing on the left and 2 screws on right.
8. Install the left table guide assembly.

   Refer to *Installing the Table Guide-Left*, page 4-22.
9. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
10. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, page 37.

11. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

12. Perform strip centering setup and the strip walk test.

    Refer to *Using Setup Strip Centering*, page 4-53 and *Using the Strip Walk Test*, page 4-54.

Replacing the Crank Arm

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- 0.050-inch Hex wrench
- Torque driver

Removing the Crank Arm

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Move the readhead to the front of the analyzer.
5. Rotate the crank arm so that it points to the right side of the analyzer.

   This also moves the slide arm to the right. For more information about the Baseplate assembly, refer to *Parts and Schematics*, page 5-1.

6. Remove the Phillips screw holding the shaft in place.
7. Slide the shaft to the left.
8. Tilt the rail support forward to clear the strip detector assembly and lift up.

   This removes the slide arm from the analyzer.

9. Loosen the set screw, now in the 12 o'clock position, with the short arm of a 0.050-inch Hex wrench.
10. Pull the crank arm off the push bar drive motor shaft.

Installing the Crank Arm

1. Push the crank arm onto the push bar drive motor shaft.

   Align the flat spot of the crank arm with the flat spot of the motor shaft.
2. Align the front of motor shaft with the front of crank arm.
3. Tighten the set screw.
4. Position the slider arm so that it engages the guide rail on the baseplate.

   Ensure that the shaft is aligned with its hole.
5. Slide the Shaft through the slider arm and into its support on the motor casting.
6. Install the lock washer and Phillips screw to secure the shaft in place.
7. Tighten the screw to 8 inch-pounds of torque.
8. Grease the shaft.

   Refer to *Parts and Schematics*, page 5-1.
9. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
10. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
11. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Baseplate Mechanism

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver
- Torque Driver

Removing the Baseplate Mechanism

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

4. Remove the 5 (M4x12) Phillips screws, one at each corner and one in middle of mounting plate.

   NOTE: The screw on the right back corners go through a grounding strap.

5. Disconnect the 2 strip detector flex cables, one from the MOTHER PCB, PL11 and PL9.

6. Disconnect the pre-amp A/D flex cable from MOTHER PCB, PL1.

   NOTE: Move the Baseplate assembly slightly forward of its mounting position for better access to the connectors on the MOTHER PCB.

7. Disconnect the optical sensors and motor cables from the MOTHER PCB:
   a. fixed platform sensor, PL8
   b. crank arm sensor, PL12
   c. push bar motor, PL5
   d. readhead drive motor, PL2
   e. moving table motor, PL4
   f. moving table sensor, PL1

8. Gently lift the baseplate mechanism assembly upward.

   Use the right-hand table guide and the push bar rail support for lifting.

Installing the Baseplate Mechanism

1. If you are replacing the baseplate assembly, transfer the analyzer serial number label from the old baseplate to the new baseplate.

   Affix the label to the left front top corner of the assembly.

2. Use the right-hand table guide and the push bar rail support to lift and gently set the baseplate mechanism assembly into position.

3. Connect the optical sensors and motor cables to the MOTHER PCB:
   a. fixed platform sensor, PL8
   b. crank arm sensor, PL12
   c. push bar motor, PL5
   d. readhead drive motor, PL2
   e. moving table Motor, PL4
   f. moving table sensor, PL1

4. Connect the A/D pre-amp flex cable to PL10.
5. Connect the strip detector power cable to PL9.
6. Connect the strip detector data flex cable to PL11.
7. Install the 5 (M4x12) Phillips screws, one at each corner and one in middle of mounting plate.
8. Tighten the screws to a torque of 18 inch-pounds and 12 inch-pounds for the ground strap at the card.
9. Install the upper case.

   Refer to *Installing the Upper Case*, page 4-12.
10. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
11. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Removing the Lower Case

You need the following tools to perform this procedure:

- #2 Phillips screwdriver for M4 screws
- #1 Phillips screwdriver for all others
- Torque Driver

1. Remove the printer.

   Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.
2. Remove the fixed platform.

   Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

3. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
4. Remove the electronics bracket.

   Refer to *Removing the Electronics Bracket*, page 4-28.
5. Remove the baseplate mechanism.

   Refer to *Removing the Baseplate Mechanism*, page 4-45.

6. Remove the MOTHER PCB.

   Refer to *Removing the MOTHER PCB*, page 4-31.

Installing the Lower Case

1. Position the MOTHER PCB onto the lower case.
2. Install the 6 Phillips screws securing the MOTHER PCB to the lower case.
3. Install the 3 back screws securing the MOTHER PCB back plate and new conductive Gasket to back of lower case.
4. Tighten the screws to a torque of 7 inch-pounds.
5. Use the right-hand table guide and the push bar rail support to lift the baseplate mechanism assembly and gently set it into position.

   NOTE: Before setting assembly in place secure the wires and cables out of the way.

6. Install the 3 M4x12 Phillips screws, one at each front corner and one in middle of the mounting plate.
7. Connect the optical sensors and motor cables to the MOTHER PCB in the following order:
   a. fixed platform sensor, PL8
   b. crank arm sensor, PL12
   c. push bar motor, PL5
   d. readhead drive motor, PL2
   e. moving table motor, PL4
   f. moving table sensor, PL1
8. Connect the cables in the following order:
   a. strip detector Power cable to PL9
   b. strip detector Data flex cable to PL11
   c. A/D Pre-Amp flex cable to PL10
   d. printer interface Data cable to PL3
   e. printer interface power cable to PL6
9. Set the electronics bracket in place.
10. Connect the main power ground wire to the bracket next to the main power in.
11. Connect the main power cable to the power supply SK1.
12. Connect the data interconnecting flex cable to PL13.
13. Connect the power supply cable assembly to the MOTHER PCB PL15.
14. Tighten the 3 electronics bracket mounting screws.
15. Install the upper case.

    Refer to *Installing the Upper Case*, page 4-12.

16. Install the fixed platform.

    Refer to *Performing the Daily Cleaning* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

17. Install the printer.

    Refer to *Replacing the Printer* in the *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Replacing the Power Entry Module and Power Switch

You need a standard blade screwdriver to perform this procedure.

Removing the Power Entry Module and Power Switch

1. Remove the power entry module assembly:
   a. Using the tip of your screwdriver, push on the module locking arm on the top of the module and tipping the module out.
   b. Then using the screwdriver, pry up on the lower 2 locking arms to disengage the bottom half of the module.
2. Pull the module out of mounting hole.

   The large ferrite should be able to pass through the opening.
3. At the back of the power switch, pull off the connectors to disconnect the wiring.

   Recode the pin out prior to removing the wiring to make for easier connection on assembly.
4. Depress the switch.

Installing the Power Entry Module and Power Switch

1. Set the power entry module assembly into the hole in the back panel with the ground, the center pin on the module, up.
2. Push the module into the hole until the locking arms on the Module engage with the lower case.
3. Push in the power switch.

   The hole is keyed to the switch; place the notch to the bottom of the hole.
4. Attach the wiring to the backside of the power switch.

   Follow your pin out guide.
5. Assemble the lower case assembly.

   Refer to *Installing the Lower Case*, page 4-48.

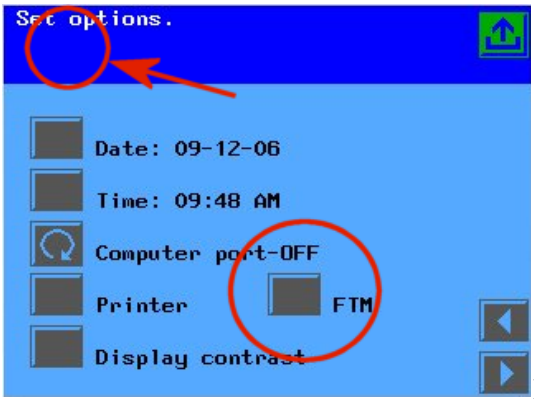
Accessing the Factory Test Mode (FTM)

The Factory Test Mode (FTM) is a special part of the analyzer software used during the manufacturing and servicing of the Clinitek Advantus analyzer. The following section of the manual explains the function of each test.

To access the Factory Test Mode, perform the following steps:

1. Turn on the analyzer.
2. At the Ready screen, select **MENU**.
3. At the Menu screen, select **SETUP**.
4. At the Setup screen, double-select the hidden button under the screen title Set Options.

   The screen displays a button labeled FTM.



h

Figure 4-28 Setup Screen

5. Select **FTM**.
6. At the prompt, type **73448** as the password.

   A warning screen displays alerting you that the analyzer setup is reset to manufacturing settings if you continue.

   a. Select **YES** to access Factory Test Mode.

      The FTM initial ready screen displays.

   b. Select **NO** to exit and return to the customer mode.

Using the Ready Screen

When the analyzer displays this screen, it is ready to detect a test strip and process it the same as in the customer mode. The difference between FTM and customer mode is that in FTM, the analyzer is always in Test Mode 1, which outputs reflectance and decode data for the results.

Setting the Serial Number

Select **SERIAL #** to display the serial number for the analyzer. This is usually displayed as 0000000. This is an optional field and you may enter the analyzer serial number, if needed.

Setting the Sequence Number

1. Select **SEQ #** to display the sequence number entry screen.

   The screen displays the current sequence number a cursor under the first digit.

2. To enter a new sequence number, select the appropriate number buttons on the screen.

3. Select the enter button.

   The analyzer returns to the READY screen.

   You can also use the reset button reset the sequence number to 00001.

Printing Setup

Select **PRINT SETUP** to print the current analyzer setup using the internal thermal printer.

Setting up the Analyzer

Select **Setup** to display the Setup screen containing analyzer functions that you can review or modify. Options that are followed by a colon display the current setup configuration.

Function	Description
DATE	used for setting the date
TIME	used for setting the time
Clear Memory	used for clearing the memory or resetting it to default values
INTERNAL PRINTER	toggles the internal printer on or off The default setting is on.
Strip Type	used to select what type of reagent strip is used MULTISTIX 10 SG is the default.
RESET Strips read	a continuous tally of strips tested on the analyzer You can reset the number to 0, if necessary.
Display Contrast	a coarse adjustment of the display contrast from 0 – 255

Using the Instrument Tests Screen

The diagnostic tests provided by the Instrument Test Card are grouped in 4 levels or sub menus. The Instrument Tests screen displays each level of test as a separate menu. In many cases, only the description of the test is listed here. The procedures in these cases are listed in different sections, as needed.

- Level 1 Tests are for all subinstruments.
- Level 2 Tests are for the interface.
- Level 3 Tests are all related to data collection.
- Level 4 Tests are for operations that are specific to processor 1.

Using Level 1 Tests

The Instrument Tests, Level 1 screen has the following options:

- Instrument Release Test
- Exercise All Motions
- Sensor Status
- Setup Strip Centering
- Strip Walk Test
- Level 2 Tests

Using the Instrument Release Test

The Instrument Release Test is part of the Service Release Testing. You can perform just the analyzer Release Test, as necessary, or perform it as part of the service release. For information about performing the Instrument Release Test, refer to *Performing the Instrument Release Test*, page 4-68.

Using the Exercise All Motions Test

The analyzer operates all motors and actions as a normal performance cycle with the appropriate delays. Selecting this option displays a prompt to select the number of cycles to perform the test.

You can select the number of cycles of operation. The screen displays the current cycle number along with any detected error. If the test generates errors, the screen only displays the most recent error. The error is cleared from the screen when you select the return to Ready Run.

Using the Sensor Status Screen

This test displays the current status of all of the mechanical sensors as in Figure 4-29 *Sensor Status Screen – Normal Status*, where the status can have a value of YES or NO.

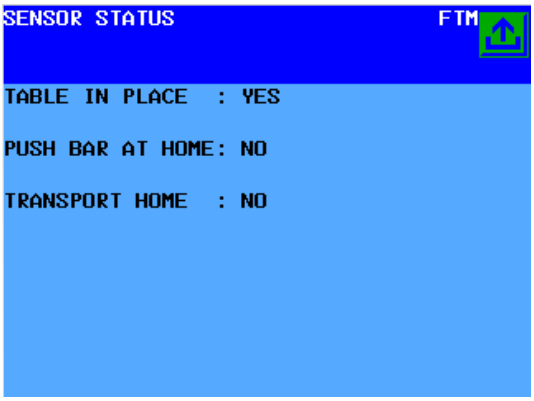


Figure 4-29 Sensor Status Screen – Normal Status

When the fixed platform and moving table are installed and the analyzer is in the Ready state, the normal sensor status values are as follows:

Sensor	Status
Table in Place	YES
Push Bar Home	YES
Transport Home	NO

Using Setup Strip Centering

This test performs an automatic strip centering function that positions the strip in the correct location, left to right, under the readheads. After you select this option, the screen displays the current centering steps and prompts you through the procedure.

Use the centering steps to position the table so that a strip is centered under each of the readheads. In this procedure, the drive mechanism advances the reagent strip a fixed number of motor steps, equal to the strip centering number, past the home position sensor activation point.

The analyzer moves the strip position to the left of the read position (position where the strip is directly under the readhead) and the readheads move until they are mid-strip. The analyzer then steps the moving table (and strip) slowly toward the readheads. The readheads take IR readings with each step until the reflectance reaches 50%. This 50% point is considered as the edge of the strip.

The moving table then moves 42 motor steps, to center the strip under the readhead. During the 42-step advancement of the Drive-Mechanism, the home position sensor changes state. The analyzer counts the number of steps from the position where the sensor first changes state to the center position. This number is the strip centering value.

The analyzer then advances the strip to the second readhead and repeats the procedure. The analyzer checks that the strip centering values from each readhead are within set limits of 4 to 40 steps, and then checks that these values are within 10 steps of each other.

If the strip centering values fail either test, an error condition occurs. The analyzer sets the step count to 00 and reports a 34 error code.

The analyzer averages and stores the steps from each readhead and sends them to processor 1 (MAIN PCB) for storage in permanent memory.

Whenever you reprogram processor 2 (MOTHER PCB), the analyzer sends the cal factors message to processor #2, including the centering steps. In the Strip Centering screen, the centering steps, AA, are displayed as follows:

```
Steps from sensor to center: AA
```

The value listed below this statement is either Pass or Fail.

Using the Strip Walk Test

This test calibrates the analyzer using 10 dry test strips. As the strips are moved under each readhead, the strip tip is located with respect to each Calibration Bar and stored in memory. After the analyzer determines the location of all 10 strips with both readheads, it analyzes the data and prints the data using the internal printer.

The first line of data, labeled RH1, is the location of each of the 10 strips read at readhead 1. The second line of data, labeled RH2, is the location of each of the 10 strips read at readhead 2. These values are measurements in motor steps and can range between 0 and 8. A value of 4 is optimal.

- A number lower than 4 indicates that the tip of the strip is closer to the calibration bar.
- A number greater than 4 indicates that the tip of the strip is further away from the calibration bar.

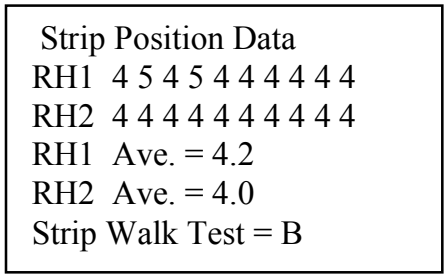


Figure 4-30 Printed Strip Walk Test Report

The next 2 lines are the average position values for the 10 strip readings taken under each readhead, RH1 Ave. and RH2 Ave.

The last line is Strip Walk Test = X where X is equal to one of 3 values, A, B, or C. These values represent different sets of criteria:

- C means the analyzer detected a strip at position 0 or position 8 at either readhead.
- B means the analyzer detected a strip at position 2 or position 6 6 or more times at either read head.

  Or, that the average for either readhead is less than 3 or greater than 5.5.

  Or, the analyzer detected a strip at position 1 or position 7 at either readhead.
- A means None of the Above.

NOTE: All new analyzers have passed a burn in test in which the drive housing was cycled 8000 times.

During service, you use a different set of criteria for new drive housing assemblies, assemblies with less than 8000 cycles, and a used drive housing assembly with 8000 or more cycles. The criteria for the used assembly makes allowances for normal parts wear.

An analyzer with a new drive housing assembly must report Strip Walk Test = A. If it reports B or C, this analyzer fails the Strip Walk Test.

An analyzer with a used drive housing assembly must report Strip Walk Test = A or Strip Walk Test = B. If it reports Strip Walk Test = C, this analyzer fails the Strip Walk Test.

When an analyzer fails this test, you must realign the horizontal plate on the drive housing assembly or replace the drive housing.

Refer to *Realigning the Horizontal Plate*, page 4-6 or *Replacing the Drive Housing*, page 4-41, as appropriate.

Using Level 2 Tests

The tests at this level exercise the I/O interfaces with all subassemblies that require bi-directional communication. These include the following tests:

- Test serial ports
- Test printers
- Test touchscreen
- Test strip detector
- Test display

Using Test Serial Ports

Use this Level 2 screen to test the following ports:

- Computer Port

  Follow the instructions on the screen and test this port using a loop-back connector.

  The analyzer sends a test message and the received message displays. The first and last characters are checked for correspondence.

- PS2 Port

  You must attach a barcode reader to the PS2 port and follow the instructions on the screen.

- Ethernet Port

  You must connect to a PC network to the port and follow the instructions on the screen for this test.

Using Test Printers

Use this test to test communications with either the internal and external printers. If the internal printer is selected as the default printer in the analyzer setup, then the internal printer is tested. If the external printer is selected as the default, the external printer is tested.

When you select TEST PRINTERS, the analyzer sends a test message to the analyzer printer. The message is a combination of ASCII characters, that tests all of the pixels of the printer, Figure 4-31 *Printer Test Pattern*. You must connect a printer to test the external printer. Refer to *Testing the External Printer*, page 4-64.

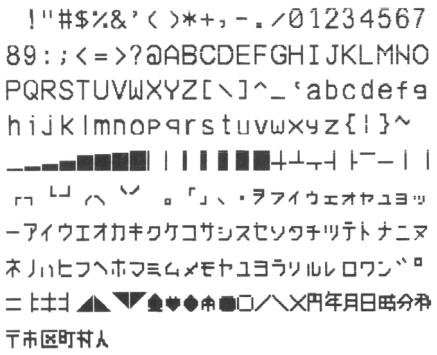


Figure 4-31 Printer Test Pattern

Using the Test Touchscreen Option

The touchscreen test routine displays a test screen with 40 boxes. When you touch a box, the box displays a check mark. Along the top of the screen, the screen displays the line and column you selected along with the A-D readings from that location.

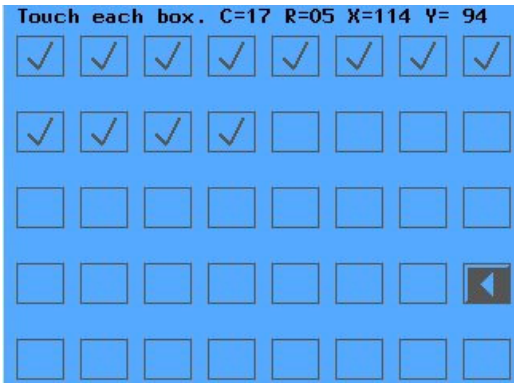


Figure 4-32 Touchscreen Test Screen

- C = the column containing the box that you touch
- R = the row containing the box you touch
- X = the X-coordinate position that you touch on the screen
- Y = the Y-coordinate position that you touch on the screen

Touching the  key returns you to the Level 2 test menu.

Using the Test Strip Detector Option

Use this option to perform one of the following tests:

- print detector setup values
- strip verify test

Using Print Detector Setup Values

Select **PRINT DETECTOR SETUP VALUES** to print the values of the current detector setup on the analyzer printer. The allowable range for the setup values is 10 to 254.

Using the Strip Verify Test

Select **STRIP VERIFY TEST** to determine if the strip detector senses the presence of a strip in the load zone. If the strip detector detects a strip, the analyzer responds with a beep.

Using the Test Display Option

Select **TEST DISPLAY** to test the screen pixels. When you select this option, the screen displays the following message for 2 seconds:

```
ALL PIXELS WILL BE DISPLAYED
```

The screen then performs 3 cycles, turning all the pixels on the screen on and then off for 5 seconds for each cycle. After the cycle is complete, the analyzer returns to the Instrument Test Level 2 screen.

Using Level 3 Tests

Use this group of tests to test the illumination, pre-amp, and Analog to Digital (A/D) subanalyzers of the analyzer.

Using the Lamp on/Off Option

At the Instrument Tests, Level 3 screen, you can select **on** to turn the lamps on or **off** to turn the lamps off. The screen displays the current lamp state toward the right of the screen.

Use this option in conjunction with tests to determine specific information about the readhead Pre-AMPs and A/D PCB.

Using the Read A-D Counts Option

Select **READ A–D COUNTS** and this test prints the A-D converter RAW counts read from viewing whatever the readheads are positioned over. The analyzer prints out all 8 channels of A-D readings on the internal printer and sends the readings to the computer port. The limits for the A/D counts are listed in the following table:

Readhead-channel	Lamp on	Lamp off
1-IR	800-2046	1-400
1-RED	800-2046	1-400
1-GREEN	800-2046	1-400
1-BLUE	800-2046	1-400
2-IR	800-2046	1-400
2-RED	800-2046	1-400
2-GREEN	800-2046	1-400
2-BLUE	800-2046	1-400

Using the Test Readheads Option

Use this option to test the readheads.

At the Level 3 Instrument Tests screen, select **TEST READHEADS** and the readheads home on the cal chip using readhead 1. The analyzer takes readings, represented as A-D converter counts, for the cal chip and the dark values for all 8 channels and then prints them as in Figure 4-33 *Sample Test Readheads Printout*.

The analyzer also measures and prints the readhead 2 cal chip edge correction value. This value indicates the number of read positions, motor steps measuring 0.01716 inches, that readhead 2 is in or out from readhead 1.

- number of positions in is indicated by a minus sign
- number of positions out is indicated by a plus sign

The optimal position for readhead 2 calibration edge correction (RH2 CAL EDGE CORR.) is ± 1 and the highest acceptable limit is ± 3.

If the value is outside of the ± 3 range, the analyzer generates a General Error 30.

The acceptable range for CA1 and CA2 is 600 to 1846.

The acceptable range for DK1 and DK2 is 1 to 400.

```
     READHEAD TEST
     IR  RED GREEN BLUE
CA1 1379 1254 1209 1245
DK1 0200 0185 0202 0200
CA2 1482 1278 1226 1271
DK2 0203 0187 0192 0201

RH2 CAL EDGE CORR. = -1
```

Figure 4-33 Sample Test Readheads Printout

Using the Reflectance Test

Use this test to measure the reflectance values for each pad position of a test strip at each readhead on the analyzer.

1. At the Level 3 Instrument Tests screen, select **REFLECTANCE TEST**.
2. Place a hard standards strip at the load station of the fixed platform.
3. Select **OK** to start the operation.

   The analyzer moves the strip to the first readhead for scanning, to the second readhead for scanning and then moves it to the waste station.

The stores the reflectance values for all 11 pad positions from each readhead, a total of 88 reflectance values. At the completion of the test, the user may print the test data from either or both readheads as in Figure 4-34 *Sample Readhead 1 Data*.

```
#00001 9707161505
 3000 80
     IR  RED GREEN BLUE
A1  0113 0057 0089 0107
A2  0113 0064 0097 0144
A3  0038 0028 0097 0097
A4  0125 0068 0106 0107
A5  0115 0057 0101 0107
A6  0113 0057 0093 0090
A7  0113 0057 0089 0097
A8  0115 0057 0097 0114
A9  0110 0057 0093 0124
A10 0066 0036 0114 0084
A11 0113 0057 0080 0090
```

Figure 4-34 Sample Readhead 1 Data

Using Level 4 Tests

The tests grouped in this level confirm proper operation of the control circuits for readheads, moving table, and the push bar. Additionally, 2 tests are available for determining if data is transferring between the 2 processors correctly.

NOTE: Any errors generated in these tests are displayed on the screen.

The following options confirm operation:

- CYCLE READHEADS, moves the readhead mechanism one full cycle
- CYCLE TABLE, advances the moving table one complete cycle
- CYCLE PUSHER BAR, moves the push bar one complete cycle

At the Level 4 screen, you can select the option to perform the action.

Using the Read Strip, Dump Data Test

This test provides a means of viewing the raw data without being routed through processor 2, thus isolating data errors.

To perform the test, perform the following steps:

1. Select **READ STRIP, DUMP DATA**.
2. Place a hard standards strip at the load station of the fixed platform.
3. Select **OK**.

The analyzer moves the strip to the first readhead and scans it. The analyzer transfers the data, represented as A-D converter counts, to processor 1, which echoes the data to the RS-232 port. No storage or handshaking is involved.

The analyzer moves the strip to the readhead 2 and the process is repeated. The analyzer then moves the strip to the waste bin.

Using the Print Transferred Data Option

Select **PRINT TRANSFERRED DATA** to print the last data message that was sent to processor 1 from processor 2.

```
00
#00003 9707151307 000044
6608 2508 0707 5608 2205
0856 0503 0612 0489 0571
0665 0688 0707 0609 1063
0636 0658 0623 0519 0980
0804 0825 0753 0609 1963
0826 0830 0722 0573 1144
0844 0761 0660 0534 0842
0838 0761 0660 0534 0842
0838 0755 0614 0431 0733
0868 0820 0683 0608 0834
0426 0388 0370 0350 0292
0842 0814 0691 0590 1000
0830 0819 0722 0648 0871
9D
```

Figure 4-35 Transferred Data Printout

Service Release Testing

This section describes cleaning and release test procedures that must be performed prior to releasing any Clinitek Advantus analyzer back to a customer or into a branch's Customer Service analyzer exchange pool. You must follow these procedures for all analyzers processed by Bayer HealthCare customer service even if no repair was actually made.

Use the *Clinitek Advantus Release Test Log*, page 4-71.

NOTE: All of the tests are performed in Factory Test Mode (FTM). Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.

Cleaning and Inspection

Prior to release of any analyzer, carefully inspect to ensure the following:

- cables are routed properly
- connectors are secure
- no missing or loose screws
- no sharp edges are on the outer case

Inspect the analyzer for cleanliness and cosmetic defects and replace or clean analyzer components as necessary. Pay particular attention to components that are stained as a result of repeated contact with reagent, like the push bar or the fixed platform assembly.

For more information about cleaning the analyzer, refer to *Clinitek Advantus Operator's Guide*, Section 5, *Maintenance*.

Performing Exercise All Motions

Refer to *Using the Exercise All Motions Test*, page 4-52.

1. Enter the Factory Test Mode (FTM).
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **EXERCISE ALL MOTIONS**.
4. Select **10 CYCLES**.

   If all 10 cycles do not pass, an error message is displayed.

Testing Serial Ports

Refer to *Using Test Serial Ports*, page 4-56.

Testing the Computer Port

You need a Computer Port DB9 loop back Connector (P/N 133295) to complete this test.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. At the Instrument Tests, Level 2 menu, select **TEST SERIAL PORTS**.
5. Install the Loop-back connector on the DB9 serial port.
6. Select **COMPUTER PORT**.
7. Confirm that the data sent matches the data received.

   If they match, the test passes.

Testing the Ethernet Port

You need an RJ45 loop back Connector (P/N 71647006) to complete this test.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.

3. Select **LEVEL 2 TESTS**.
4. Select **TEST SERIAL PORTS**.
5. Install the RJ45 Ethernet loop-back connector.
6. Select **ETHERNET PORT**.
7. Confirm that the data sent matches the data received.

   If they match, the test passes.

PS2 Port (Barcode / Keyboard)

You need a barcode reader to complete this test.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST SERIAL PORTS**.
5. Install the barcode reader.
6. Select **BARCODE READER PORT**.
7. Scan a known barcode, for example, the color/clarity card.
8. Confirm that the data displayed on screen matches the barcode.

   If they match, the test passes.

Testing the Printers

Refer to *Using the Read A-D Counts Option*, page 4-58.

Testing the Analyzer Printer

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST PRINTERS**.
5. Select **INSTRUMENT PRINTER TEST**.

   The following pattern should print:

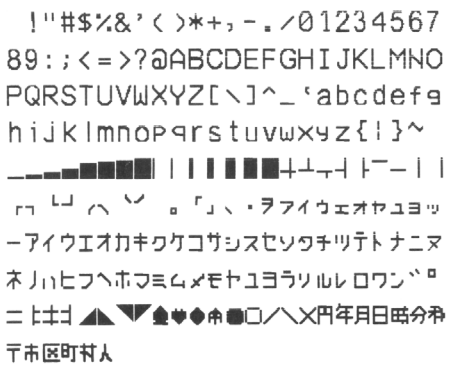


Figure 4-36 Internal Printer Test Pattern

Testing the External Printer

You need a parallel interface to complete this test.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST PRINTERS**.
5. Connect a printer to the parallel port.
6. Select **EXTERNAL PRINTER TEST**.

   The following pattern should print:

   ```
   (0123456789) CAPITAL LETTERS, small letters.
   ```

Testing the Touchscreen

Refer to *Using the Test Touchscreen Option*, page 4-57.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST TOUCHSCREEN**.
5. Touch each box displayed on the screen.

   A check mark is displayed after you touch the box.
6. To exit, select the  button to return to the Instrument Tests, Level 2 menu.

Testing the Display

Refer to *Using the Test Display Option*, page 4-58.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST DISPLAY**.

   All pixels must be highlighted.
5. To exit, select the arrow in the upper right corner.

Performing the Cycle Readheads Test

Refer to *Performing the Cycle Readheads Test*, page 4-65.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **LEVEL 3 TESTS**.
5. Select **LEVEL 4 TESTS**.
6. Select **CYCLE READHEADS**.
7. If an error code is not displayed, the test passed.
8. To exit, select the arrow in the upper right corner.

Performing the Strip Detector Test

Refer to *Using the Test Strip Detector Option*, page 4-57.

You need Multistix®10 SG Reagent Strips to complete this test.

1. Access the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST STRIP DETECTOR**.
5. Place a Multistix10 SG reagent strip on the fixed platform.

   When the analyzer detects a strip, it beeps.
6. Move the strip over the fixed platform covering all the valid strip placement positions.

These positions are between the push bar and the hood of the upper case that covers the readheads. Keep the end of the strip, the last pad, inside the back rib on the platform.

7. Verify that 5 LEDs are flashing.
8. Select **PRINT DETECTOR SETUP VALUES**.
9. Inspect the printout and confirm that the values are between 10 and 254.
10. If the analyzer reports 0 or 255, the analyzer fails the test and the analyzer must be rejected and returned for troubleshooting.

Performing the Cycle Table Test

Refer to *Using Level 4 Tests*, page 4-60.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **LEVEL 3 TESTS**.
5. Select **LEVEL 4 TESTS**.
6. Select **CYCLE TABLE**.
7. If an error code is not displayed, the test passed.
8. To exit, select the arrow in the upper right corner.

Performing the Cycle Pusher Arm Test

Refer to *Using Level 4 Tests*, page 4-60.

1. Enter the Factory Test Mode.
2. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
3. Select **LEVEL 2 TESTS**.
4. Select **LEVEL 3 TESTS**.
5. Select **LEVEL 4 TESTS**.
6. Select **CYCLE PUSH BAR**.

   If an error codes is not displayed the test passed.
7. To exit, select the arrow in the upper right corner.

Setting up Strip Centering Tests

Refer to *Performing the Strip Detector Test*, page 4-65.

You need the following equipment for this test:

- Floating Rail Hold-down (PN 133388)
- Hard Standard Strip (PN 95002262)

1. Install the floating rail hold-down onto the fixed platform.
2. Install the fixed platform onto the analyzer.
3. With the analyzer power on, enter the Factory Test Mode.
4. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
5. Select **SETUP STRIP CENTERING**.

   The screen displays the strip centering value that is currently stored in the analyzer memory.
6. Place the hard standard strip onto the load zone of the fixed platform.
7. Select **OK**.

   The analyzer advances the strip under the readheads, calculates a new strip centering value, and stores it in the analyzer memory. The acceptable range is 4 to 40.

Performing the Strip Walk Test

NOTE: If the analyzer fails this test, it indicates that you need to replace the drive housing assembly.

Refer to *Using the Strip Walk Test*, page 4-54.

You need the following materials to complete this test:

- Multistix 10 SG Reagent Strips
- Normal hold-down

1. Enter the Factory Test Mode.
2. Confirm that the fixed platform has the normal, customer holddown in place.

   If it does not, replace it with a customer version and install the fixed platform back in the analyzer.
3. Select **INSTRUMENT TEST**.

   This displays the Instrument Tests, Level 1 menu.
4. Select **STRIP WALK TEST**.

   The analyzer prompts to have 10 dry strips ready to load onto the load zone of the fixed platform.
5. Select **OK**.

   The analyzer starts the test. As you place each strip onto the load zone of the fixed platform, the pusher arm activates and moves the strip to the moving table.
6. The analyzer prints out the data and test results on the internal printer.

7. To determine if the analyzer passes the test, refer to *Using the Strip Walk Test*, page 4-54.

Performing Lubrication

You must perform lubrication at this stage of the Release Tests.

1. Clean the push bar slide arm shaft with alcohol.
2. Apply a thin coat of Lubriplate 630-AA Multi-purpose Grease, PN 50336008.

Performing the Instrument Release Test

You need the following materials to perform this test.

- Serial test cable (DB25 to DB9 Null Modem Cable) (PN 40453255)
- Release Test Software (PN SR00169X)
- Release Test Limits file (PN SR00170X)
- Hard Standard Test Strip (PN 95002262)
- Floating Rail Hold-down (PN 71647013)
- Thermal Printer Paper
- IBM-PC Compatible computer with the following minimum requirements:
  - 1 GHz CPU
  - 256 MB RAM
  - Microsoft Windows 2000 or XP
  - 1 free serial port (RS232, COM 1)

For information about current part numbers and fixtures, refer to *Clinitek Advantus Operator's Guide*, Appendix C, *List of Replacement Parts* (RSL) 024E1420.

The Instrument Release Test uses the special test strip listed above and a PC performing the release test software to perform a quality check on the operation of the analyzer. In this test data is output from the analyzer and collected by the PC performing the release software. You analyze the data and compare it to predefined limits. If the results are within the limits, the analyzer passes the test. The PC screen displays a pass or fail.

The test strip that is used for the release test has colored pads in the following positions P4, P9, P10, and P11.

NOTE: This test could fail because of a program version number mismatch. If this is the case, review the detail screen and confirm that all other Instrument Release tests passed and continue the Release testing.

NOTE: Every time you perform this test, the results overwrite previous test results.

1. Turn off the analyzer and connect the Clinitek Advantus 9 pin serial cable to the serial port on the PC.
2. Install the floating rail hold-down on the fixed platform.
3. Install the fixed platform on the analyzer.
4. Turn on the analyzer.
5. Enter the Factory Test Mode.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
6. Select **INSTRUMENT TESTS > INSTRUMENT RELEASE TEST**.
7. Place the test strip onto the reagent load area of the fixed platform and select **OK**.

The analyzer moves the strip to the first readhead and scans the strip 10 times, performing the normal positioning, calibration, and readhead movement. The analyzer saves only the reflectance results for output.

The analyzer performs calibration on the first calibration chip. During the calibration, the analyzer stores the reflectances, light counts, and dark counts. Following calibration, the analyzer takes and stores 29 reflectance readings.

The analyzer stores the results from the first readhead as sequence number 001. It then moves the strip as quickly as possible to the readhead 2, repeats these actions, and stores the results as sequence number 002.

After the strip is read at readhead 2, the results are available and ready for output when queried by a connected computer.

You may print the results for each readhead.

Performing the MEMORY RESET

After you complete the release tests and the analyzer passes all tests and passes the wet testing, you must reset the memory.

1. At the Ready / Run screen, select **SETUP**.
2. Select **CLEAR MEMORY**.
3. Select **Reset System Memory**.

   This erases all results from memory and resets the fixed memory locations to the default values.

Confirming Configuration

If you are returning an original analyzer to a customer, ensure that you are provided a copy of the original analyzer setup report before you perform any service work or software updating. Accessing the FTM or performing a software update changes the analyzer settings back to the default.

Updating a Analyzer with New Software

If you are updating the analyzer to a new version of software and it is necessary to maintain customer setup parameters, perform the following steps:

1. Obtain a copy of the original setup report printed from the analyzer prior to servicing.
2. Exit the Factory Test Mode.
3. At the Ready/Run screen, turn the power off and then on.
4. Select **MENU**, and then select **SETUP**.
5. Using the original customer setup report as a reference, make the necessary changes to the analyzer setup.
6. After you make all of the changes, turn the power off and then on.
7. Print a copy of the new setup report and compare it to the original setup report to confirm all changes.

Placing the Analyzer in the Customer Exchange Pool

If you are placing the analyzer in customer service exchange pool, make sure that the latest version of software is installed.

Clinitek Advantus Release Test Log

Date:_____/_____/_____

Serial Number:_____Software Version _____

Cosmetic Inspection and Cleaning..... ___

Exercise All Motions..... ___

Test Serial Ports..... ___

Computer Port..... ___

Barcode Reader Port..... ___

Auxiliary Port..... ___

Printer..... ___

Internal Printer..... ___

External Printer..... ___

Test Touchscreen..... ___

Test Display..... ___

Cycle Readheads..... ___

Test Strip Detector..... ___

Cycle Table..... ___

Cycle Blotter..... ___

Set Strip Centering..... ___

Strip Walk Test..... ___

Lubrication..... ___

Service release Test..... ___

Reset Memory..... ___

Confirm Software Configuration..... ___

Performed by: _____ Date: _____

Release approval: _____Date: _____

Parts and Schematics

Analyzer schematics for the Clinitek Advantus Urine Chemistry Analyzer are provided as reference only. The circuit boards as not intended to be serviced at the component level.

Interconnection PCB

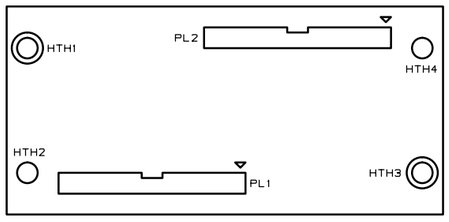
ASL REVISION HISTORY				
ISSUE	ASL CHANGE NOTE	DATE	DRAWN	APPROVED
IC	CR1102 CR1112	100806	DC	PTM

DATA INTER-CONNECT

SHEET 2

Revision History

1A - FIRST DRAFT
1B - ADD BAYER PART NUMBERS + ROUTE GND CONNECTIONS AS STRAIGHT THROUGH TRACKS
IC - RENAME NETS TO MATCH FUNCTION IN DESIGN



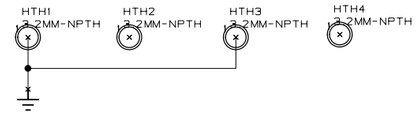
Layout sketch see Bayer Drawing 109078 MOD 1, or PCB 108938 REV A (drilling layer) for exact PCB dimensions, connector and hole positions

UL_80X_21X7
HLAB5
PLACE PCB MANUFACTURERS UL MARK HERE (flammability)

HLAB2
STATIC_LABEL
5

HPCB1
PCB
PCB

Position tooling / mounting holes as per mechanical drawing.



HTH1 and HTH3 to have top and bottom side copper ground rings connected by vias - These rings are also to be connected to ground fill in untracked top and bottom side areas of the PCB

BAYER PART NUMBERS	
Schematic	108763 REV B
Assembly	108990 REV ■
Bare PCB	108938 REV A

Add Bayer PCB number and issue to Component side copper Layer

Add Bayer Assembly number and issue to Component side IDENT Layer

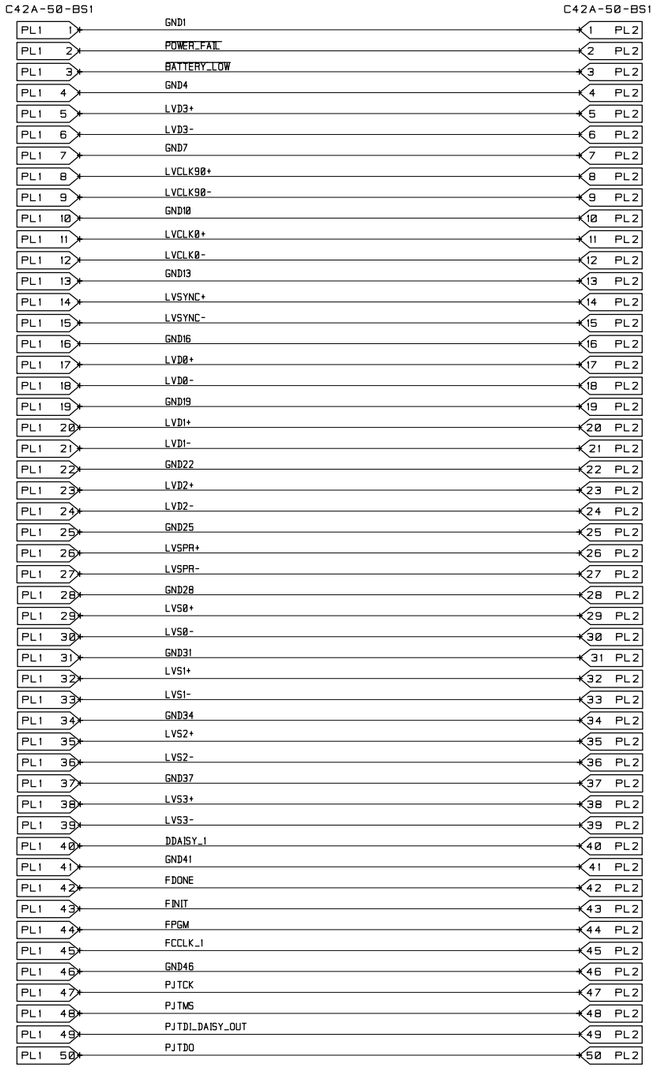
108763 REV C

This sheet is for documentation purposes. No circuitry beyond tooling holes, fiducials and similar generic items should be added to this sheet.

ASSOCIATED PCB IS ASL0557_4 at issue 1
BAYER PCB NUMBER IS 108938 REV A

CONTRACT NUMBER IS ASL-8557

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_4s1c.scm
DWG NO	CT500+ Back Board
SHEET	1 of 2



108763 REV C

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_4s1c.scm
DWG NO	CT500+ Back Board
SHEET	2 of 2

MOTHER PCB

U17
BS62LV2006STC-55

U13-A
AT89C51ED2-RDTIM

*EXTPROC

U1-C
FPGA0557_3_U1_FT256_I4

PLACE CLOSE TO U1

CPU2 MEMORY INTERFACE

133334 REV R

ROBOTICS & MEASUREMENT PROCESSOR (UP2)

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	2 of 9

PLACE 1K EMC RESISTORS
CLOSE TO FPGA. THE 1K
5V TOLERANCE RESISTOR
FOR FPGA INPUT RADC_DO
CAN BE PLACED AT ANY POINT
BETWEEN PL10 AND U1

U1-D
FPGA0557_3_U1_FT256_I4

12_WAY_SIL_PLUG_50THOU

PL10 1 RA_DI
PL10 2 RA_DO
PL10 3 CAMP_ENABLE
PL10 4 RA_CS
PL10 5
PL10 6
PL10 7 RA_CLK
PL10 8
PL10 9
PL10 10
PL10 11
PL10 12

HT432 TPI

R139 0R-0603 CAMP_EN

C27 100NF-0603-50V
C28 100NF-0603-50V
*NF 10K-0603
*NF 1K0-0603-1%
R37

NOTE: RADC DATA NETS
NAMED FOR THEIR FUNTION
(DIRECTION) ON THE READ
HEAD

1K0-0603-1%
1K0-0603-1%
1K0-0603-1%
1K0-0603-1%

HT92 HT109 HT110 HT111 TPI
R60 R61 R62 R63
HT137 HT138 HT139 HT140 TPI

RADC_DI R6
RADC_DO R7
RADC_CS T6
RADC_CLK T7

BZH H3
BZL H4

SOUNDER

RADC_DI (output)
RADC_DO (input)
RADC_CS
RADC_CLK

ADC

SD.DAC0 M6
SD.DAC1 M7
SD.DAC2 N6
SD.DAC3 N7
SD.DAC4 N8
SD.DAC5 P6
SD.DAC6 P7
SD.DAC7 P8

DAC0
DAC1
DAC2
DAC3
DAC4
DAC5
DAC6
DAC7

STRIP DETECT

SD.C0 L3
SD.C1 L2
SD.C2 L1
SD.C3 M2
SD.C4 M1
SD.C5 N3
SD.C6 N2
SD.C7 N1

C0
C1
C2
C3
C4
C5
C6
C7

STRIP DET

EXT.LED0 N5
EXT.LED1 P4
EXT.LED2 P5
EXT.LED3 R5
EXT.LED4 T5
EXT.LED_ENABLE R8

EXT.LED0
EXT.LED1
EXT.LED2
EXT.LED3
EXT.LED4
EXT.LED_ENABLE

TXD1 A7
RXD1 A9
CTS1/(RXD3) B9
DSR1/(RXD2) C9
RTS1/(TXD3) D9
DTR1/(TXD2) E7
CD1 D7
RI1 C7
DEBUG_SELECT B7

TXD1
RXD1
CTS1/(RXD3)
DSR1/(RXD2)
RTS1/(TXD3)
DTR1/(TXD2)
CD1
RI1
DEBUG_SELECT

RS232

UARTS

UP2.TXD R14
UP2.RXD P16

EXT_UP2_TXD
EXT_UP2_RXD

RTC_SCLK T3
RTC_IO R4
RTC_RST T4

RTC

USB_CTL_IO_7_2V5 G5
USB_CTL_IO_6_2V5 F5
USB_CTL_IO_5_2V5 D3
USB_CTL_IO_4 D5
USB_CTL_IO_3 C4
USB_CTL_IO_2 C5
USB_CTL_IO_1 B4
USB_CTL_IO_0 B5

USB_CTL_IO_7_2V5
USB_CTL_IO_6_2V5
USB_CTL_IO_5_2V5
USB_CTL_IO_4
USB_CTL_IO_3
USB_CTL_IO_2
USB_CTL_IO_1
USB_CTL_IO_0

USB

Reset & Power Control

SYS_RESET A4
POWER_FAIL A3
BATTERY_LOW B3

SYS_RESET
POWER_FAIL
BATTERY_LOW

PTR_EXT_PE E10
PTR_EXT_STROBE E11
PTR_EXT_BUSY D12
PTR_EXT_D0 D11
PTR_EXT_D1 D10
PTR_EXT_D2 C11
PTR_EXT_D3 C10
PTR_EXT_D4 B11
PTR_EXT_D5 B10
PTR_EXT_D6 A11
PTR_EXT_D7 A10

PTR_EXT_PE
PTR_EXT_STROBE
PTR_EXT_BUSY
PTR_EXT_D0
PTR_EXT_D1
PTR_EXT_D2
PTR_EXT_D3
PTR_EXT_D4
PTR_EXT_D5
PTR_EXT_D6
PTR_EXT_D7

PRINTERS

PTR_INT_STROBE T12
PTR_INT_ERROR T11
PTR_INT_READY R11
PTR_INT_D0 N12
PTR_INT_D1 P11
PTR_INT_D2 P12
PTR_INT_D3 P13
PTR_INT_D4 R12
PTR_INT_D5 R13
PTR_INT_D6 T13
PTR_INT_D7 T14

PTR_INT_STROBE
PTR_INT_ERROR
PTR_INT_READY
PTR_INT_D0
PTR_INT_D1
PTR_INT_D2
PTR_INT_D3
PTR_INT_D4
PTR_INT_D5
PTR_INT_D6
PTR_INT_D7

PRINTERS

Readhead
RA T10
RB R10
RC P10

Pusharm
PA P9
PB N10
PC N9

Walking Beam
WA N11
WB M11
WC M10

MOTOR DRIVE

MOTOR DRIVERS

PS/2 I/F

PS2DATO A12
PS2DATD A13
PS2DATI A14
PS2CLKO B12
PS2CLKD B13
PS2CLKI C12

P2DO
P2DO_EN
P2DI
P2CO
P2CO_EN
P2CI

TPI HT385 HT384 HT406 HT304 HT317 HT290

OPTO / LAMP CTL

WB_LIMIT M13
PA_LIMIT N14
TB_DET N15
LAMP_EN N16

WB_LIMIT
PA_LIMIT
TB_DET
LAMP_EN

XPORT
XPORT-XE U25

+3V3
FG GND 10
VCC 1
RST 2
DOUT 3
DIN 4
CP1 5
CP2 6
CP3 7
FG 8
9

ETH_RST
ETH_RXD
ETH_TXD
ETH_CP1
ETH_CP2
ETH_CP3

HT331 HT359 HT330 HT358 HT329 HT381 TPI

A5 ETH_RST
A6 ETH_RXD
B6 ETH_TXD
C6 ETH_CP1
D6 ETH_CP2
E6 ETH_CP3

RTC

VCCRAM
TPI HT365
+3V3
R76 10K-0603-1%
5.6PF-0603 C61
RTCK1
HT176
X1
GWK-38
TPI HT165
X2
5.6PF-0603 C46
RTCK2
VCC1 VCC2
SCLK
I/O
RST
GND
U10 DS1302Z
RTC_SCLK
RTC_IO
RTC_RST
C60 100NF-0603-50V
TPI HT175 HT163 HT164

KUSB-SMT-A5IN-B
SK3 6 SK3 5 SK3 4 SK3 3 SK3 2 SK3 1
100NF-0603-50V C97
CM_USB_IO_P
CM_USB_IO_N
USB_VCC
+5
FUSE_POLY_500MA_6V
HT396 TPI F2
TPI HT397 HT405
L17 BLM18PG600SN1
HT303 HT382 HT383 TPI
SYS_RESET
HT339 HT338 USB_CTL_IO_0 R111 HT316
HT337 USB_CTL_IO_1 R110 HT271
HT336 USB_CTL_IO_2 R109 HT315
HT335 USB_CTL_IO_3 R108 HT270
HT334 USB_CTL_IO_4 R107 HT314
HT333 USB_CTL_IO_5_2V5 R106 HT269
HT332 USB_CTL_IO_6_2V5 R105 HT313
USB_CTL_IO_7_2V5 R104 HT268
TPI 470R-0603 TPI
+3V3
1 PL17 2 PL17 3 PL17 4 PL17 5 PL17 6 PL17 7 PL17 8 PL17 9 PL17 10 PL17 11 PL17 12 PL17 13 PL17 14 PL17 15 PL17 16 PL17
C85A-16-ASB1

USB MASTER EXP I/F

BZL
BZH
+3V3
+12
*SOUNDER 1K0-0603-1% R123
*SOUNDER 1K5-0603-1% R121
C9 100NF-0603-50V *SOUNDER
TPI HT385
R130 100K-0603-1% *SOUNDER
BZB
U24-A
V+
GND
HT394 TPI
*SOUNDER 47K-0603-1% R128
HT380 HT379 TPI
TPI HT357
R117 100K-0603-1% *SOUNDER
U24-B
TLE2022ID *SOUNDER
HT404 TPI
TPI HT378
*SOUNDER 47K-0603-1% R129
1 PL18 2 PL18
HARWIN-2S72 *NF

UP2 SOUNDER OPTION

+3V3
R2 10K-0603-1%
R1 4K99-0603-1%
TPI HT1 WBL
WB_LIMIT
4 PL1 3 PL1 2 PL1 1 PL1
C1 100NF-0603-50V
4_WAY_SIL_PLUG_AMP
Walking Beam Opto I/F

+3V3
R30 10K-0603-1%
R31 4K99-0603-1%
TPI HT78 TBL
TB_DET
4 PL8 3 PL8 2 PL8 1 PL8
C22 100NF-0603-50V
4_WAY_SIL_PLUG_AMP
Table Opto I/F

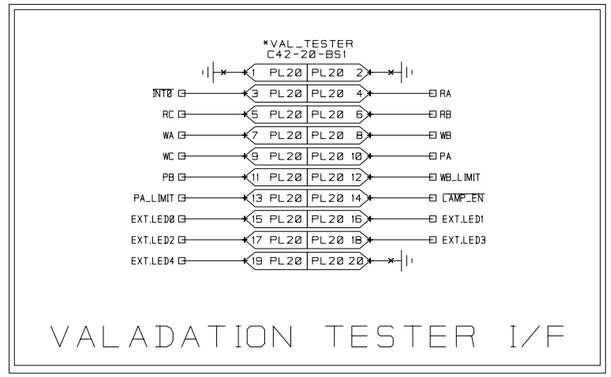
+3V3
R35 10K-0603-1%
R34 4K99-0603-1%
TPI HT86 PAL
PA_LIMIT
4 PL12 3 PL12 2 PL12 1 PL12
C23 100NF-0603-50V
4_WAY_SIL_PLUG_AMP
Push Arm Opto I/F

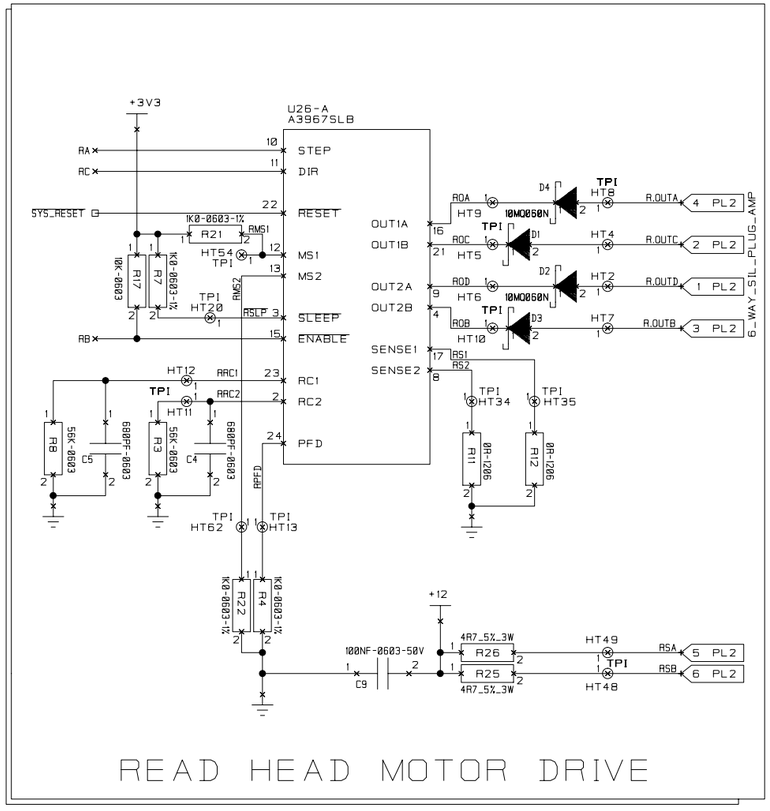
+5
C98 100NF-0603-50V
TPI HT426
L19 BLM18PG600SN1
PS2D5V
PS2D5V_R
TPI HT407
R126 22R-0603
1 SK1 2 SK1 3 SK1 4 SK1 5 SK1 6 SK1 7 SK1 8 SK1 9 SK1
MINIDIN_6W_MOLEX
PS/2 KEYBOARD
U19 DA112S1
L20 BLM18PG600SN1
PS2C5V
PS2C5V_R
HT408 TPI
HT427 TPI
22R-0603 R127
*PS2_PULLUP
IK0-0603-1% R134
IK0-0603-1% R135
*PS2_PULLUP
PS2C5V_BUF
HT374 TPI
PS2D5V_BUF
HT386 TPI
+5
74HCT125D U18-A
74HCT125D U18-B
74HCT125D U18-C
74HCT125D U18-D
R125 470R-0603 HT398 TPI PS2CK1
R112 470R-0603 HT360 TPI PS2D1
HT373 TPI
R124 1K0-0603-1%
PS2_IN_EN

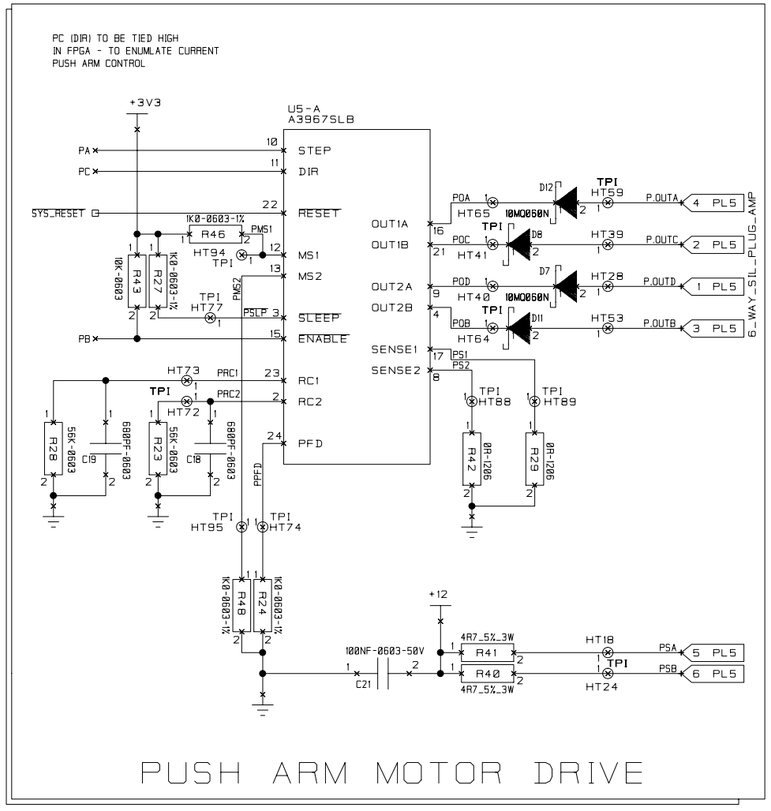
133334 REV R

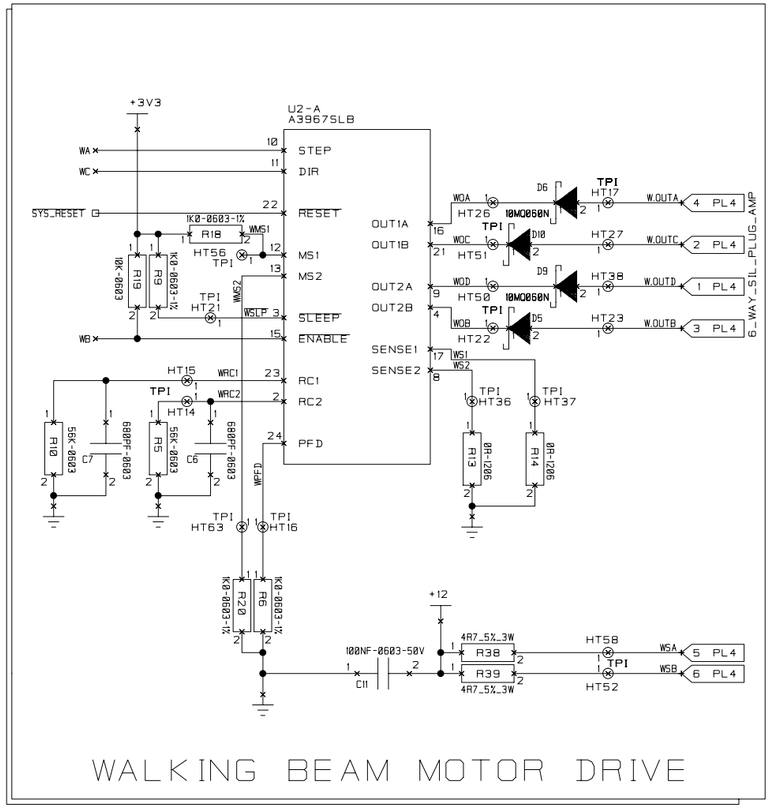
PERIPHERALS & COMMUNICATIONS

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	3 of 9





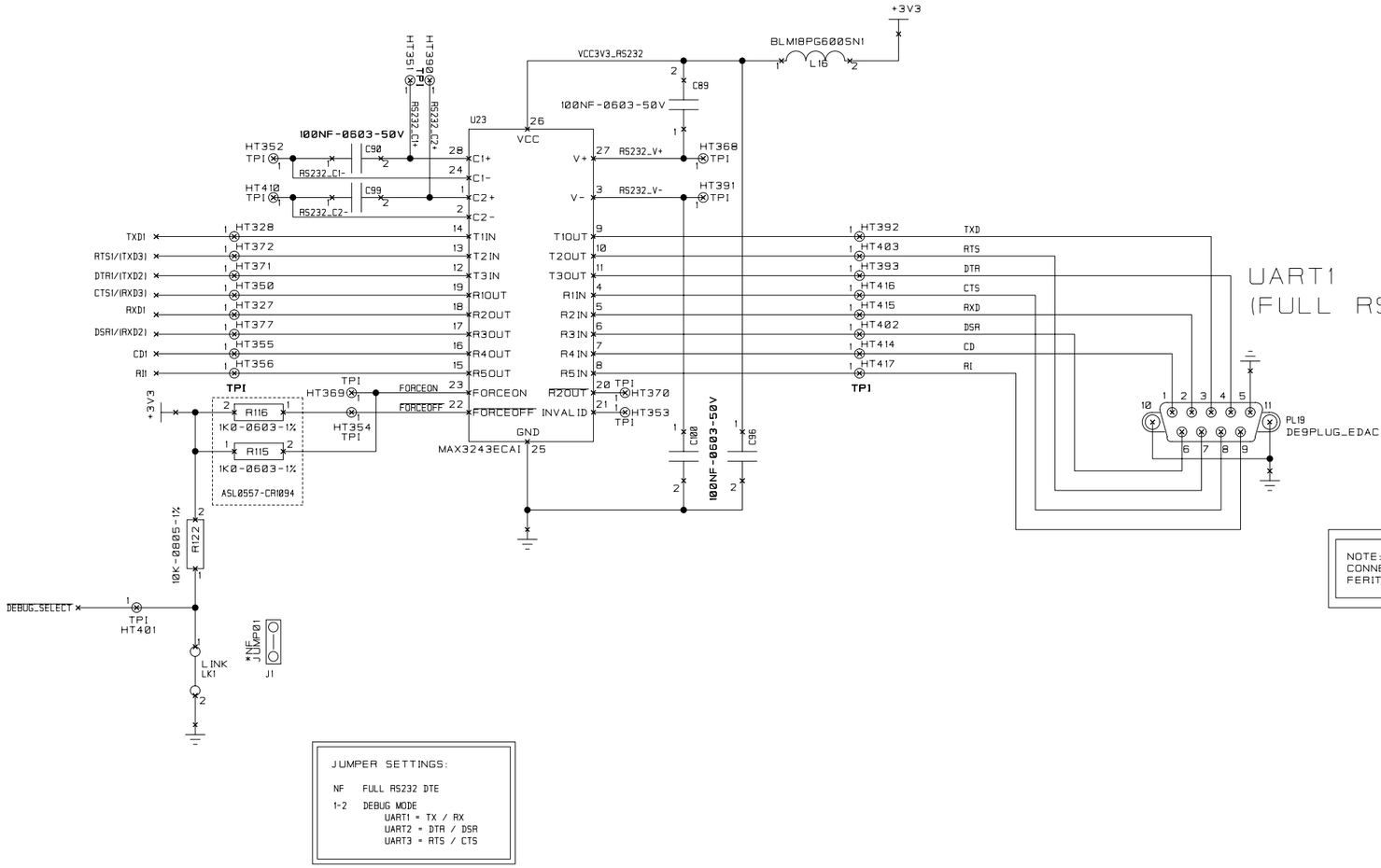




MOTOR DRIVERS

133334 REV R

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	4 of 9



133334 REV R

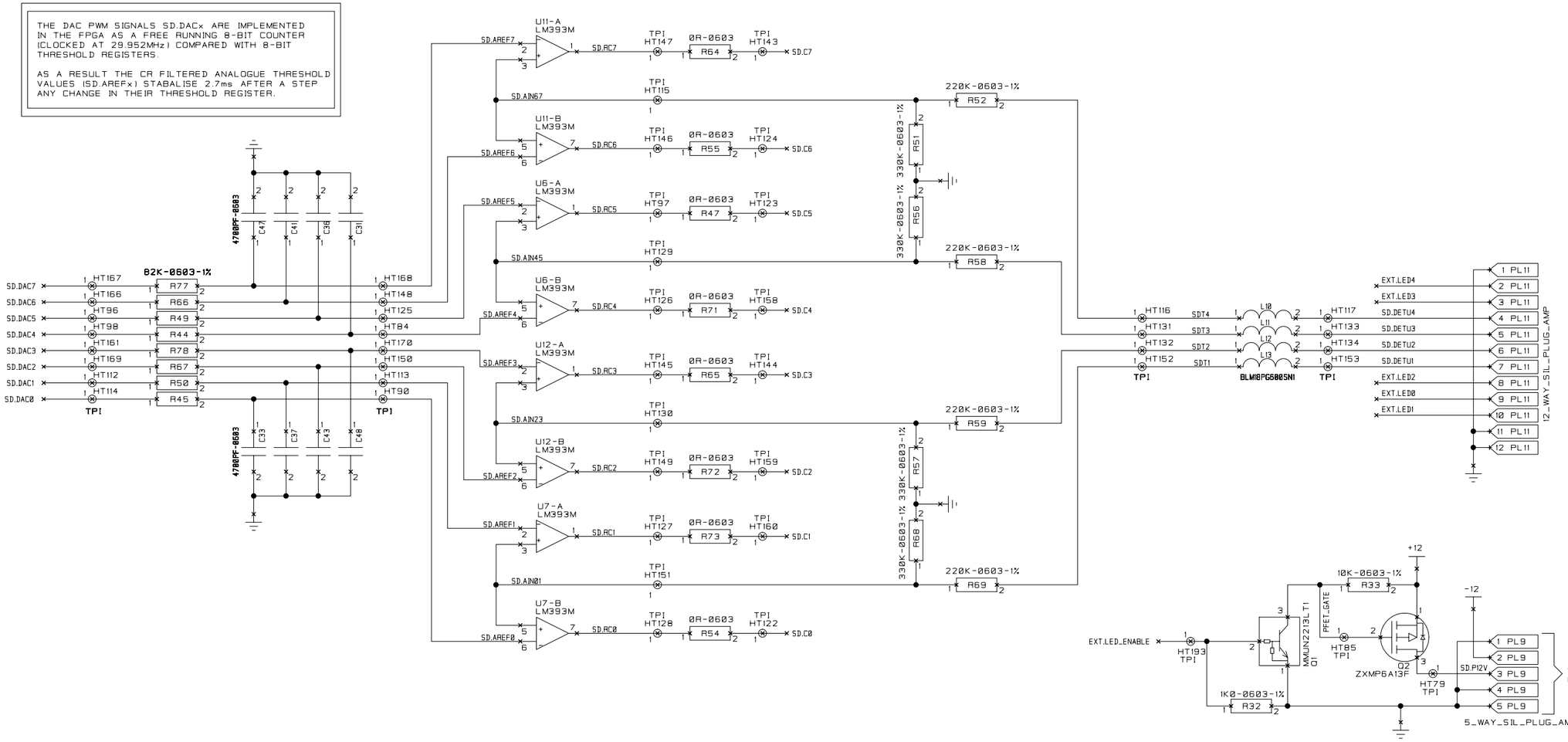
RS232 TRANSCEIVERS

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	5 of 9

PULLUP O/C COMPARITOR OUTPUTS SD.C0 - SD.C1 IN FPGA

THE DAC PWM SIGNALS SD.DACx ARE IMPLEMENTED IN THE FPGA AS A FREE RUNNING 8-BIT COUNTER (CLOCKED AT 29.952MHz) COMPARED WITH 8-BIT THRESHOLD REGISTERS.

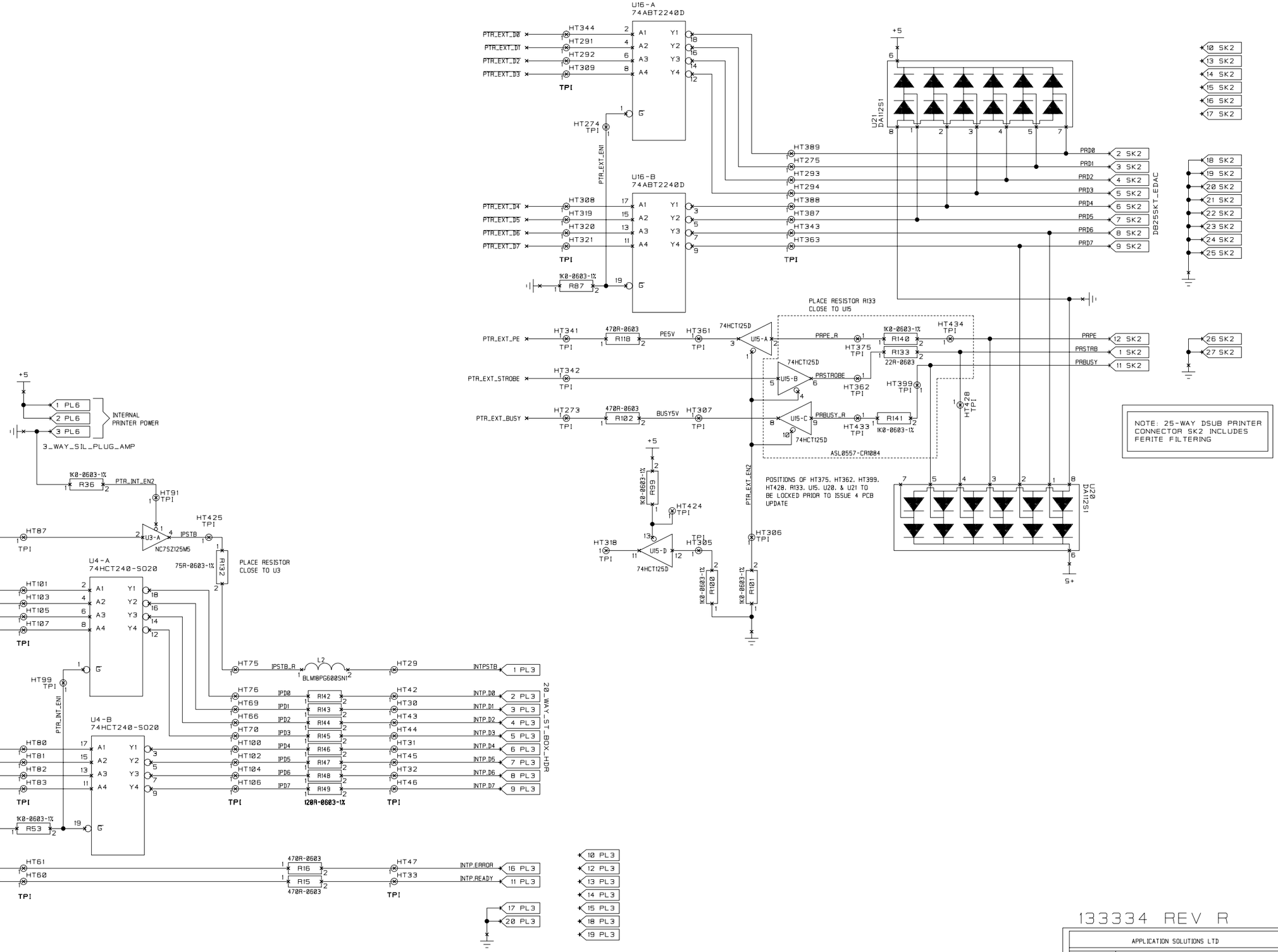
AS A RESULT THE CR FILTERED ANALOGUE THRESHOLD VALUES (SD.AREFx) STABALISE 2.7ms AFTER A STEP ANY CHANGE IN THEIR THRESHOLD REGISTER.



133334 REV R

STRIP DETECTOR

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	6 of 9



PRINTER PORTS

133334 REV R

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	7 of 9

C42A-50-BSI

PLACE TERMINATING RESISTORS AS CLOSE AS POSSIBLE TO FPGA

U1-E
FPGA0557_3_U1_FT256_14

PL13 4	LVD3+	HT285	75R-0603-1% R89	F4	LVD3+
PL13 5	LVD3-	HT177		F3	LVD3-
PL13 7	LVCLK90+	HT262	75R-0603-1% R88	G2	LVCLK90+
PL13 8	LVCLK90-	HT205		G1	LVCLK90-
PL13 10	LVCLK0+	HT284	75R-0603-1% R97	D2	LVCLK0+
PL13 11	LVCLK0-	HT178		D1	LVCLK0-
PL13 13	LVSYNC+	HT287	75R-0603-1% R98	E3	LVSYNC+
PL13 14	LVSYNC-	HT286		E4	LVSYNC-
PL13 16	LVD0+	HT206	75R-0603-1% R91	F2	LVD0+
PL13 17	LVD0-	HT179		F1	LVD0-
PL13 19	LVD1+	HT264	75R-0603-1% R90	G3	LVD1+
PL13 20	LVD1-	HT263		G4	LVD1-
PL13 22	LVD2+	HT207	75R-0603-1% R85	H2	LVD2+
PL13 23	LVD2-	HT180		H1	LVD2-
PL13 25	LVSPR+	HT181	75R-0603-1% R86	K2	LVSPR+
PL13 26	LVSPR-	HT208		K3	LVSPR-

TPI

ALL LVxxx+ and LVxxx- pairs are 75ohm controlled impedance traces

+3V3

U14

PL13 28	LVS0+	2	D1	1	QS0	HT247 J4 QS0
PL13 29	LVS0-	3				HT265 K4 LVS0+
						HT266 K5 LVS0-
PL13 31	LVS1+	6	D2	7	QS1	HT249 J3 QS1
PL13 32	LVS1-	5				HT248 L4 LVS1+
						HT267 L5 LVS1-
PL13 35	LVS2+	10	D3	9	QS2	HT245 J2 QS2
PL13 36	LVS2-	11				HT221 M3 LVS2+
						HT220 M4 LVS2-
PL13 38	LVS3+	14	D4	15	QS3	HT245 J1 QS3
PL13 39	LVS3-	13				HT218 P1 LVS3+
						HT219 P2 LVS3-
				12	QS4	HT235 K1 QS4

VCC, GND, DS90LV031ASO, 100NF-0603-50V C73

TPI

PL13 40	DDAISY_1
PL13 41	
PL13 42	FDONE
PL13 43	FINIT
PL13 44	FPGM
PL13 45	FCCLK_1
PL13 46	
PL13 47	PJTCK
PL13 48	PJTMS
PL13 49	PJTDI_DAISY_OUT
PL13 50	PJTDO

THE FPGA INTERNAL LVDS DRIVERS FOR LVS0 - LVS3 MUST NOT BE ENABLED IN THE FPGA BECAUSE:

1) THESE ARE CONFIGURED AS LVPECL IN THE FPGA TO ALLOW SLEW RATE LIMITING OF QS0 - QS4 (SEE ASL0557-CR1112)
2) THE OUTPUTS DO NOT PRODUCED LVDS LEVELS (EVEN WHEN CONFIGURED AS LVDS) WITHOUT RESISTOR CONDITIONING (SEE ASL0557-CR1050)

INTERBOARD COMMS

+3V3

10K-0603-1% R93, R94

PL16 1	PJTDI
PL16 2	PJTDO
PL16 3	PJTCK
PL16 4	PJTMS
PL16 5	SOFT_TDO
PL16 6	SOFT_TDI
PL16 7	SOFT_TCK
PL16 8	SOFT_TMS
PL16 9	
PL16 10	VCC3V3_JTAG

SAMTEC-20-10

10K-0603-1% R92

100NF-0603-50V C49

TPI HT236

F1 FUSE_POLY_0805_200MA_9V

NanoBoard Connector

FPGA CONFIG SLAVE SERIAL MODE WITH PULLUPS ENABLED

FPGA0557_3_U1_FT256_14
U1-A

+3V3

R83, R81, R82 1K0-0603-1%

HT204	R3	M2	
HT202	R1	M1	
HT203	T2	M0	
HT183	R16	PROGRAM	FPGM
HT182	T15	DONE	FDONE
HT205	P15	INIT	FINIT
HT312	A15	CCLK	FCCLK_1
HT302	B16	DIN	DDAISY_1
HT281	C15	DOUT	
HT251	A2	TCK	
HT210	B1	TMS	
HT250	C13	TDI	
HT301	B14	TDO	

TPI

GCK0	T9	TST_POINT1	HT201
GCK1	T8		
GCK2	B8	TST_POINT2	HT430
GCK3	C8		
	D8	TST_POINT3	HT283
CLKLOOP2	A8	CLKLOOP2	HT282
CLKLOOP1	R9	CLKLOOP1	
NEXUS_TCK	E1		HT253 SOFT_TCK
NEXUS_TMS	E2		HT254 SOFT_TMS
NEXUS_TDI	C2		HT222 SOFT_TDI
NEXUS_TDO	C1		HT252 SOFT_TDO

TPI HT431

TST_POINT3

TPI

TPI HT194

-JTAG_LOOP 120R-0603-1% R103P23

+JTAG_LOOP 0R-0603 R103P12

RNF-20603 R103

FPGA_TDO

TPI HT300

R103 JTAG CHAIN SETTINGS:

POSITION 1-2 120R LINK = NORMAL 3 BOARD CHAIN
POSITION 2-3 0R LINK = STANDALONE BASE BOARD CHAIN

FPGA Config

133334 REV R

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
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FPGA CONFIG & INTERBOARD COMMS

FPGA Power Supplies

U1-B
FPGA0557_3_U1_FT256_I4

VCCINT
10NF-0603
C56
C79
100NF-0603-50V
C55
C63
C78
C86
C82
C62
C85
C69
C81
C57
C77
C70
C59
C80
C58
C72
C64
C71
470R-0805-1%
R80
VCC2V5
HT233 TPI
D16
GF1A
+3V3

C3 VCCINT
D4 VCCINT
E5 VCCINT
C14 VCCINT
D13 VCCINT
E12 VCCINT
P14 VCCINT
N13 VCCINT
M12 VCCINT
P3 VCCINT
N4 VCCINT
M5 VCCINT
E8 VCCO.B0
F7 VCCO.B0
F8 VCCO.B0
E9 VCCO.B1
F9 VCCO.B1
F10 VCCO.B1
G11 VCCO.B2
H11 VCCO.B2
H12 VCCO.B2
J11 VCCO.B3
J12 VCCO.B3
K11 VCCO.B3
L9 VCCO.B4
L10 VCCO.B4
M9 VCCO.B4
L7 VCCO.B5
L8 VCCO.B5
M8 VCCO.B5
J5 VCCO.B6
J6 VCCO.B6
K6 VCCO.B6
G6 VCCO.B7
H5 VCCO.B7
H6 VCCO.B7

T16 GND
T1 GND
R15 GND
R2 GND
L11 GND
L6 GND
K10 GND
K9 GND
A1 GND
A16 GND
B2 GND
B15 GND
F6 GND
F11 GND
G7 GND
G8 GND
G9 GND
G10 GND
H7 GND
H8 GND
H9 GND
H10 GND
J7 GND
J8 GND
J9 GND
J10 GND
K7 GND
K8 GND

+5
LM393M
U11-C
U12-C
U6-C
U7-C
U18-E 74HCT125D
U15-E 74HCT125D
U16-C 74ABT2240D
U4-C 74HCT2240-SO20
U3-B NC7SZ125M5
V+ (VCC)
V- (GND)
100NF-0603-50V
C40
C42
C38
C32
C94
C93
C88
C87
C84
C83
C25
C24
C23
10NF-0603
20NF-0603-50V
HT223 TPI
HT237 TPI
HT224 TPI
HT340 TPI
HT141 TPI
HT400 TPI
HT289 TPI
HT272 TPI
HT270 TPI
HT238 TPI
HT412 TPI
HT411 TPI
HT234 TPI
HT271 TPI

HT171 TPI
HT19 TPI
HT288 TPI
HT55 TPI
HT162 TPI
HT136 TPI
+3V3
U13-B
AT89LS51ED2-RDTM
VCC
VSS
C68
C67
100NF-0603-50V
100NF-0603

+3V3
+12
U26-B A3967SLB
U5-B A3967SLB
U2-B A3967SLB
VCC
VREF
VBB1
VBB2
VSS
C12
C13
C2
C34
C35
C17
C14
C15
C3
C16
C39
C8
C20
C28
C10
100UF-25V-YXF
10NF-0603-3N00A
A05-E030-3N00A

+12
*FAN_PWR
2_WAY_SIL_PLUG_AMP
1 PL7
2 PL7
FAN

HT239 TPI
7-WAY-HEADER-AMP
POWER OUT
PL14
VBAT
+3V3

HT419 TPI
HT420 TPI

-12
+5
+12
6-WAY-HEADER-AMP
Power In
PL15
HT121 TPI
HT157 TPI
HT108 TPI
C45
C66
C75
C74
C65
100UF-63V-HJH

+12
HT135 TPI
ERR3V3
LM2597M-3.3
ERR
FB
R70P12R 0R-0805 +REG_IN_12V
R70P2R 0R-0805 -REG_IN_12V
RNF-20805
R70
VIN3V3
HT120 TPI
VIN
GND
DLY
OFF
VOUT
U9
C38
C44
100UF-50V-YXF
100NF-0805
HT154 TPI
HT119 TPI
DLY3V3
OFF3V3
B
VOUT3V3
DT3316P-104
L14
TPI
HT118
D13
10MQ060N
+3V3
C53
47NF-0805
C50
100UF-25V-YXF
3.3V REGULATOR

Isq.in Heatsink Plane on PCB
+5
U8
LP3852ES-1B
Vin
Vout
SD
ERROR
TAB
GND
ERR3
HT192 TPI
HT173 TPI
HT142 TPI
VCCINT
C51
22UF-6V3-CASE
R74
1K-0805-1%
HT155 TPI
1V8_SD
R75
10K-0805-1%
*1V8_REG_TANT
C52
C54
GJ223M1540Z
PLACE OUTPUT CAPS WITHIN 10MM OF REG
1.8V REGULATOR

+3V3
R131
1K0-0603-1%
R13
3K3-0805-1%
R14
2K7-0805-1%
R138
10K-0603-1%
HT409 TPI
PFI
HT376 TPI
RES_BUT
HT413 TPI
ALPS_SKHW
*TEST
PB1
U22-A
M40SZ100WMQ
E
PFI
RSTIN
Vout
BL
Econ
PFO
RST
R137
10K-0603-1%
VCCRAM
BATTERY_LOW
RAMEN
POWER_FAIL
SYS_RESET
HT421 TPI
HT422 TPI
HT423 TPI
C101
10NF-0603

C92
100NF-0603-50V
MBRS130LT3G
D17
ASL0557-CR1085
VCC
Vbat
U22-B
M40SZ100WMQ
VSS
R84
10K-0603-1%
HT225 TPI
VB
DIS
BAR43
HT211 TPI
VBC
BAT1
LITHIUM_HALF_AA_CELL

133334 REV R

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_3s4a.scm
DWG NO	CT500+ Instrument Control Board
SHEET	9 of 9

SUPPLIES, RESET AND BATTERY

MAIN PCB

U7-A
*EXTPROC

AT89C51ED2-RDTIM

U1-C
FPGA0557_2_U1_FT256_13

U2
BS62LV4006STC-55

U4
AM29LV320DB90EC

U8-A
M40SZ100WMQ

L4
BLM18PG600SN1
*EMC

*EMC
22R-0603-1%

HT20
TP1

HT21
TP1

C12
150PF-0603

*NF

HTS8
T3

HTS6
T3

HTS9
T3

HTS7
T3

P34

TP1
HT123

TP1
HT124

TP1
HT130

TP1
HT169

TP1
HT212

TP1
HT111

TP1
HT115

TP1
HT131

TP1
HT146

TP1
HT145

TP1
HT33

TP1
HT27

TP1
HT26

TP1
HT15

TP1
HT14

TP1
HT5

TP1
HT4

TP1
HT46

TP1
HT34

TP1
HT48

TP1
HT50

TP1
HT51

TP1
HT71

TP1
HT72

TP1
HT70

TP1
HT28

TP1
HT17

TP1
HT37

TP1
HT75

TP1
HT96

TP1
HT97

TP1
HT95

TP1
HT81

TP1
HT36

TP1
HT35

TP1
HT47

TP1
HT49

TP1
HT52

TP1
HT60

TP1
HT73

TP1
HT74

TP1
HT82

TP1
HT61

TP1
HT94

TP1
HT93

TP1
HT69

TP1
HT129

TP1
HT67

TP1
HT43

TP1
HT66

TP1
HT59

TP1
HT68

TP1
HT42

TP1
HT45

TP1
HT32

TP1
HT31

TP1
HT90

TP1
HT13

TP1
HT9

TP1
HT23

TP1
HT30

TP1
HT29

TP1
HT56

TP1
HT80

TP1
HT112

TP1
HT16

TP1
HT92

TP1
HT10

TP1
HT3

TP1
HT22

TP1
HT24

TP1
HT2

TP1
HT12

TP1
HT8

TP1
HT11

TP1
HT6

ALPS_SKHW
*RST_BUTTON

PB1

D1
TLOU1008

R1
330R-0603

HBIR

R30
10K-0603-1%

R76
10K-0603-1%

R75
10K-0603-1%

R10
3K3-0603-1%

R9
2K7-0603-1%

R7
10K-0603-1%

R2
10K-0603-1%

R11
10K-0603-1%
*NF

C10
100NF-0603-50V

C19
100NF-0603-50V

C1
100NF-0603-50V

C92
10NF-0603

+3V3

VCC

GND

VCCRAM

RAMEN

SYS_RESET

BATTERY_LOW

POWER_FAIL

RES_BUT

PFI

PFO

RSTIN

Vout

BL

Econ

RST

CPU1 Bus Interface

133328 REV F

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board User Interface & Comms Processor (1)
SHEET	2 of 7

NOTE: Traces must Run to capacitors and then to inductors
Do NOT run capacitors as spurs on the runs from
connectors to Inductors. 4 places.

Touch Screen Connection
(FPC Direct Connector)

CONN_SKT_4W_NMA_FPC_FFC_RA_BC_ZIF

NOTE: FPGA LVDS OUTPUTS ARE NOT TRUE LVDS LEVELS WITHOUT RESISTOR CONDITIONING. THE EXTERNAL DRIVERS ARE CONFIGURED BY DEFAULT IN FPGA1 V12 ONWARDS. SEE ASL CR1050

ALL LVxxx+ and LVxxx- pairs are 75ohm controlled impedance traces

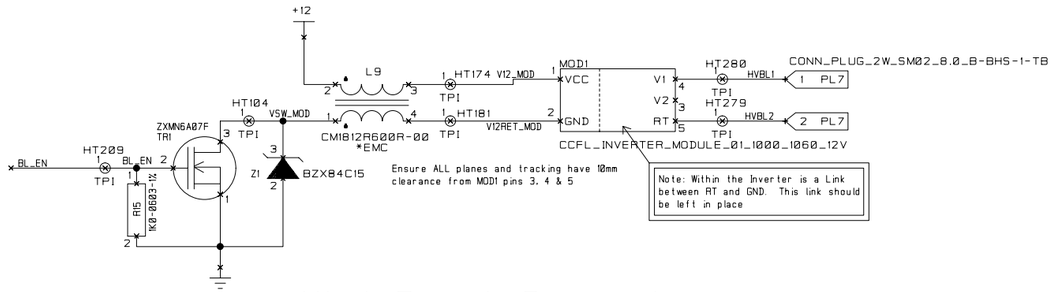
PLACE TERMINATING RESISTORS AS CLOSE AS POSSIBLE TO FPGA

*DEBUG_RS232

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board Peripherals and Communications
SHEET	3 of 7

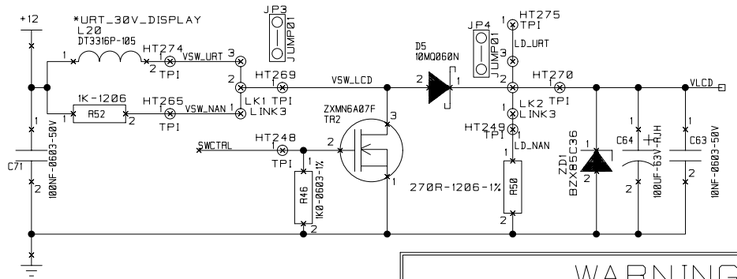
133328 REV F

LCD BACKLIGHT INVERTER



Vlcd Boost Converter

PLACE JUMPERS ON LK3 and LK4
IN POSITION 1-2 NAN YA DISPLAY (3V)
IN POSITION 2-3 URT DISPLAY (30V)

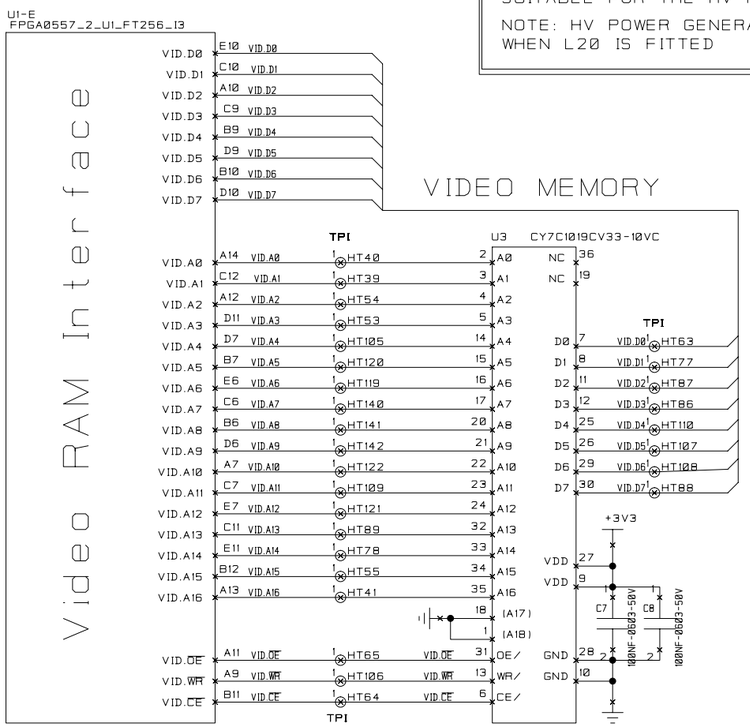


WARNING

WHEN PLACING JUMPERS ON LK3 and LK4
IN POSITION 2-3 (30V). MAKE SURE
THAT A COMPATIBLE FPGA IMAGE IS PRESENT
SUITABLE FOR THE HV POWER GENERATION

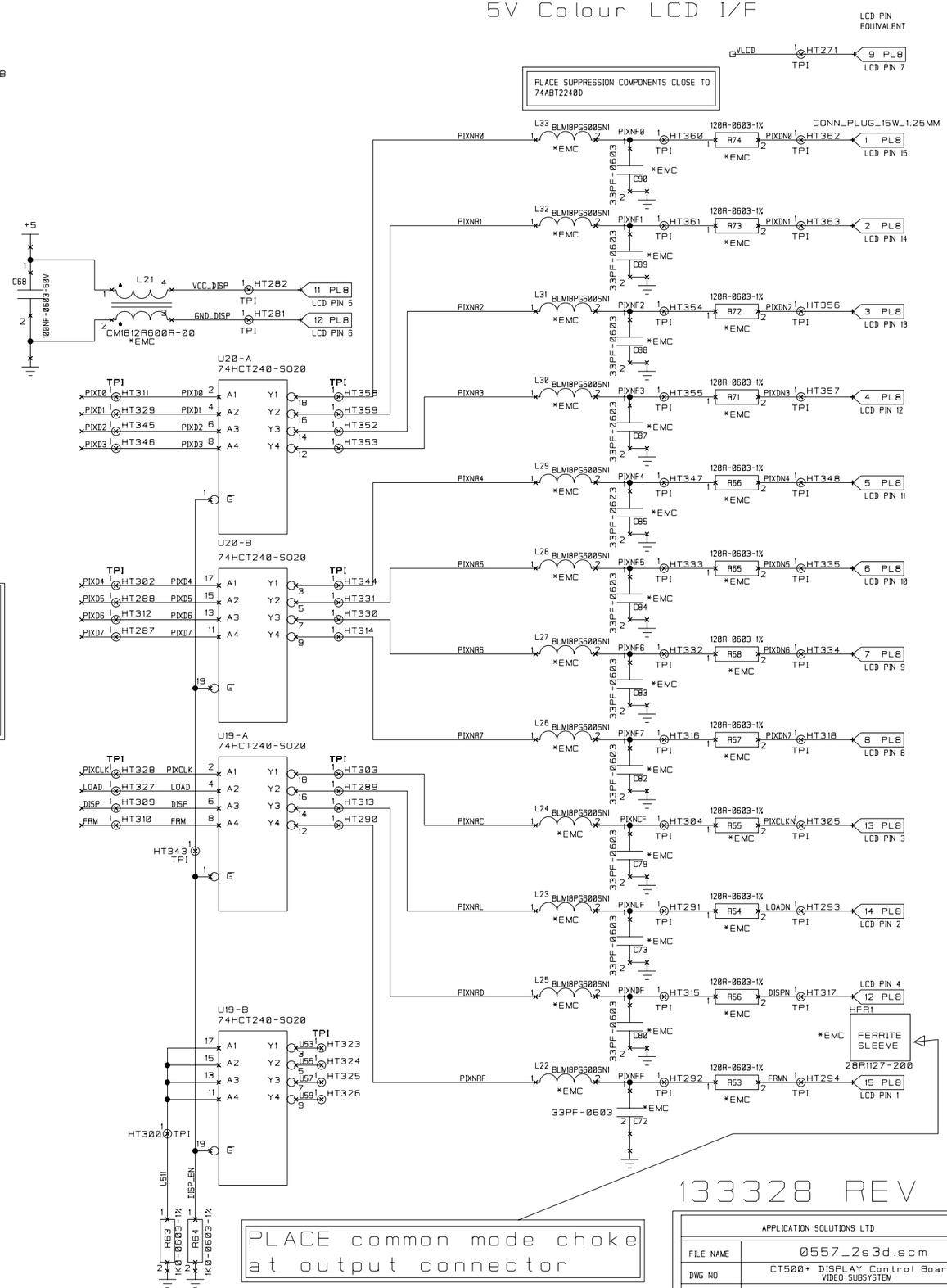
NOTE: HV POWER GENERATION ONLY POSSIBLE
WHEN L20 IS FITTED

Video RAM Interface



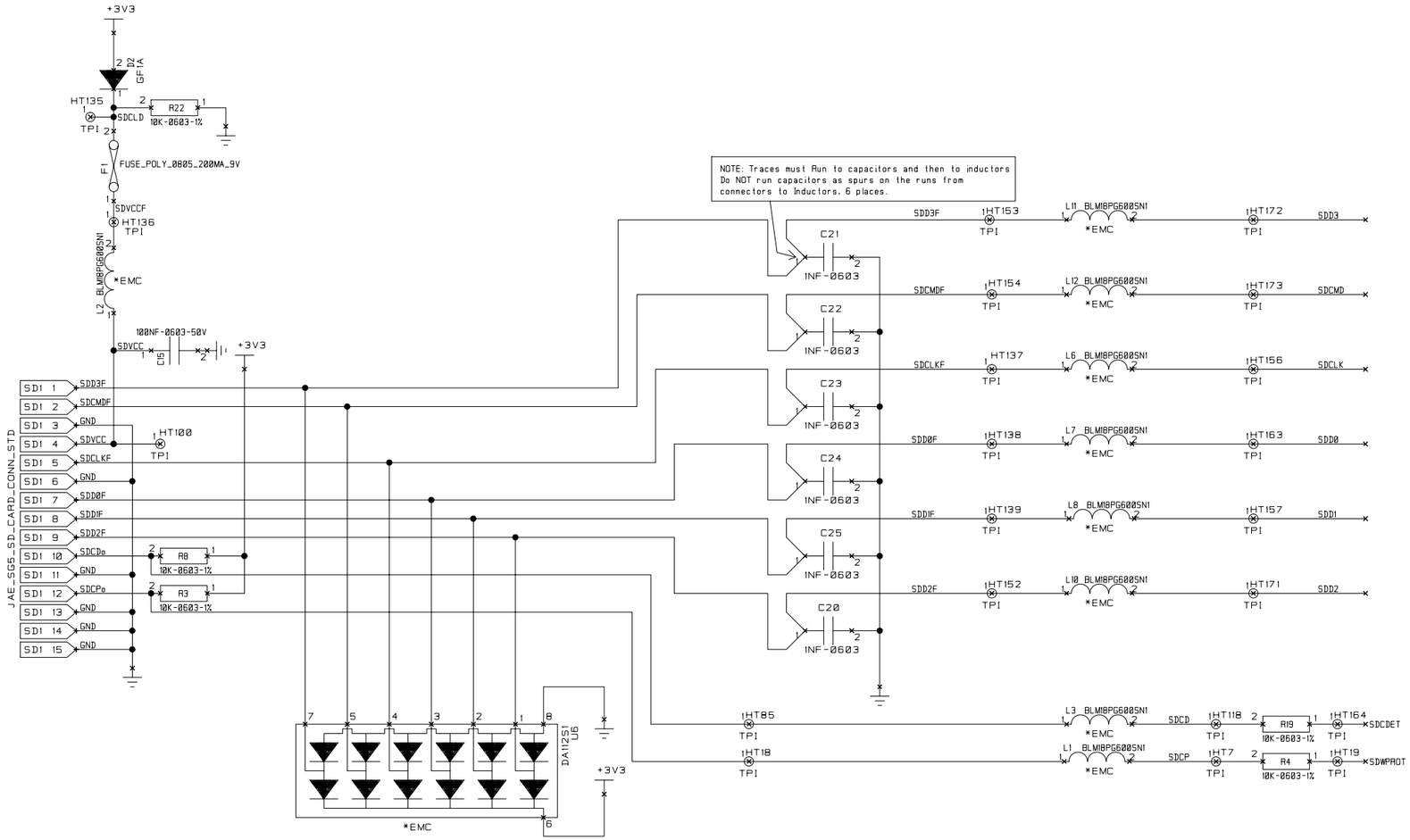
VIDEO MEMORY

5V Colour LCD I/F



133328 REV F

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board VIDEO SUBSYSTEM
SHEET	4 of 7



133328 REV F

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board SD Card Slot
SHEET	5 of 7

KEEP CONNECTIONS SHORT

SET 20 PIN CONNECTOR
INTO PCB AS SHOWN.
NO GOLD PLATING

PINS 1-10
STD JTAG

PINS 11-20
SOFT NEXAR
JTAG

Number pin 1, 3, 5...19 componentside
pin 2, 4, 6...20 solderside

CARD_EDGE_20

NanoBoard
Connector

U18
XC18V04VQ44

U1-A
FPGA0557_2_U1_FT256_I3

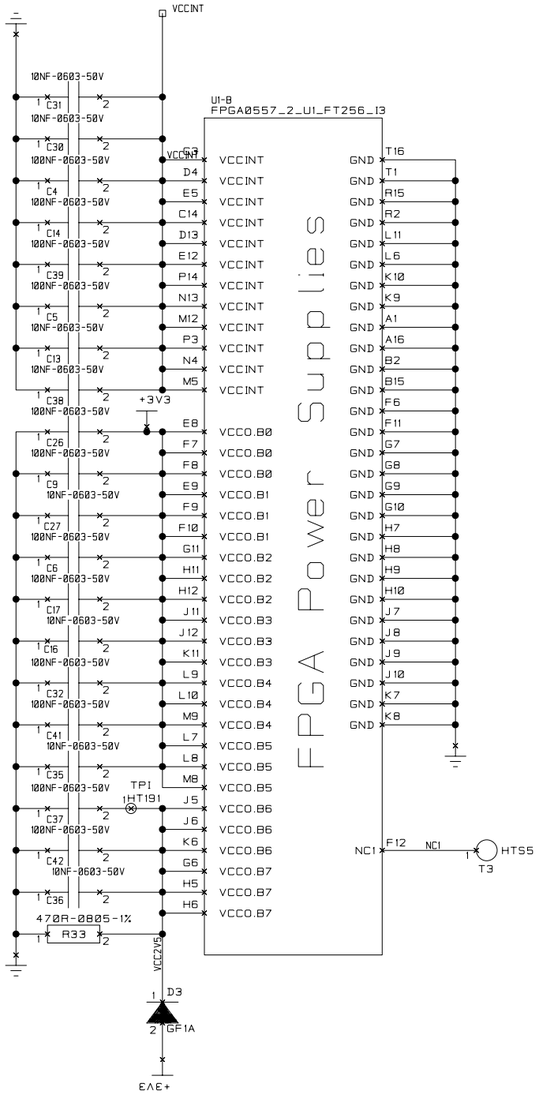
EQHM57P_55904K

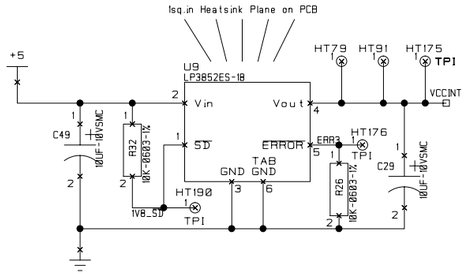
FPGA Sheet 6 of 7

133328 REV F

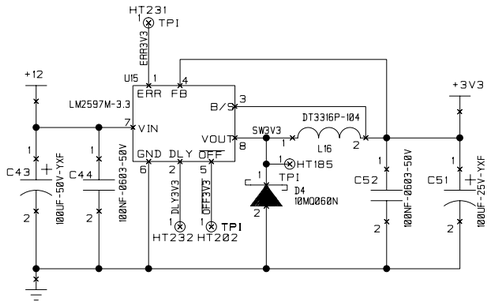
APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board FPGA Configuration & Clocking
SHEET	6 of 7

FPGA Power Supplies

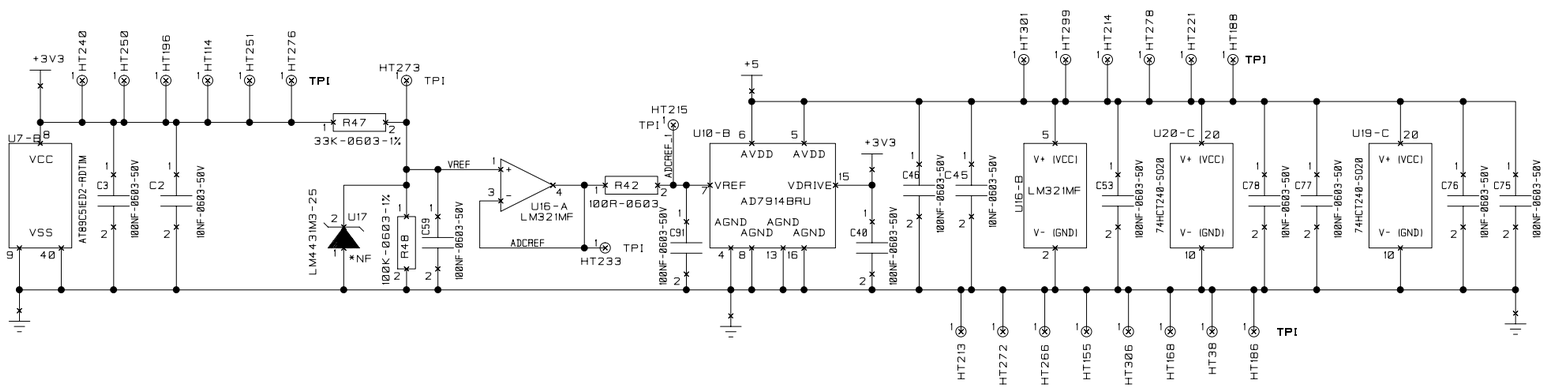


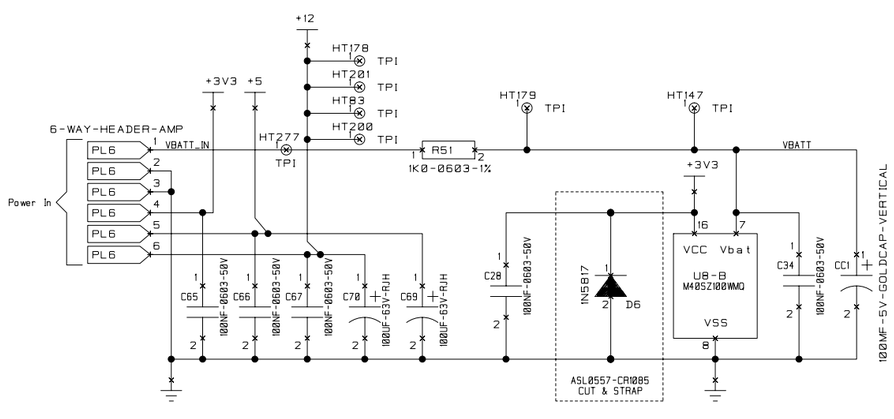


1.8V Regulator



3.3V Rail Regulator





133328 REV F

APPLICATION SOLUTIONS LTD	
FILE NAME	0557_2s3d.scm
DWG NO	CT500+ DISPLAY Control Board Power Supplies
SHEET	7 of 7

Printer Interface PCB

ECO.NO.	REV	SHT	ZONE	DESCRIPTION	BY	CHK	APP	DATE
0710D	—	--	——	DEVELOPMENT RELEASE	——	——	WE	07/21/2004
0722D	A	—	——	U1 WAS MC68HC908GP32CFB	JO	RH	WH	08/13/2004
0724D	B	—	——	+5V CONNECTIONS REMOVED FROM J1 PINS 12, 14 &15.	JO	RH	WH	09/05/04

DRAWN BY J.OLIVA DATE 01/16/04
CHK'D BY S.ROSS DATE 07/21/04
DES. ENGR W.E.HOWARD DATE 07/21/04
DATE
DATE
DATE

FOR MATERIAL AND FINISH SPECIFICATIONS SEE NOTES

DO NOT SCALE DRAWING

BAYER CORPORATION
DIAGNOSTICS DIVISION ELKHART, INDIANA

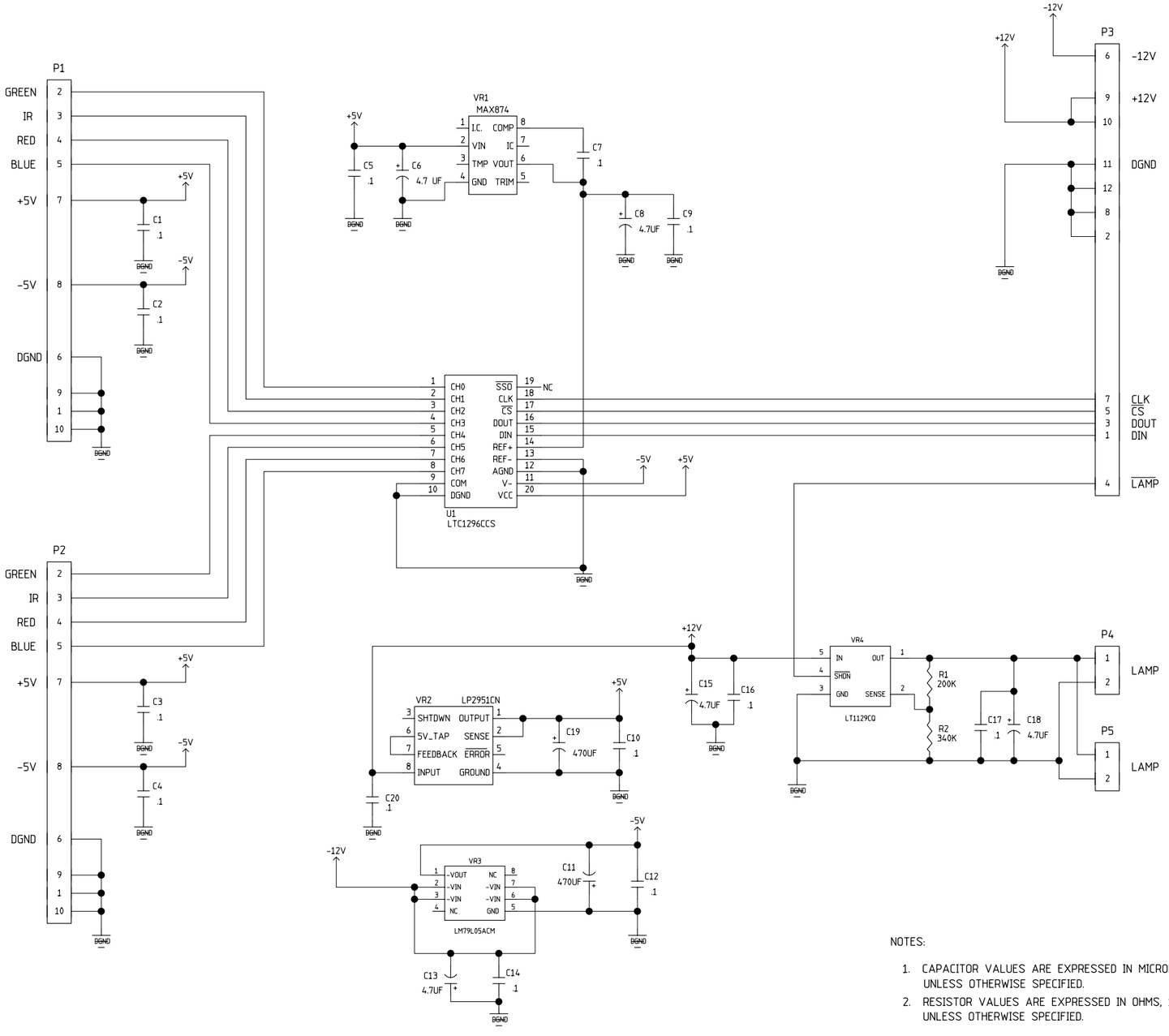
PCN. 6470

PART TITLE
PCB SCHEMATIC
APS PRINTER DRIVER

SCALE | PART NO. 98400541 | REV. B

SHT 1 OF 1

A/D Pre-Amp PCB



HIGHEST REF. DES. USED	HIGHEST REF. DES. NOT USED
C20 CR2 P5 U1 VR4 R2	

NOTES:

1. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. RESISTOR VALUES ARE EXPRESSED IN OHMS, 1% 1/8W UNLESS OTHERWISE SPECIFIED.

ECO.NO.	REV	SHT	ZONE	DESCRIPTION	BY	CHK	APP	DATE
—	–	–	—	DEVELOPMENT RELEASED	–	–	WM	6-4-97
DRC 6414	A	–	—	ADDED C19 & C20	MW	RLH	RLH	6-19-97
DRC 6578	B	–	—	VR4 WAS LT1129CQ-5 ADDED R1 AND R2 ADDED NOTE 2.	JO	SR	RR	4/20/98
DRC 6615	C	–	—	REVISED LABEL OF U1 REMOVED +5V FROM U1 PIN 19	KZ	SR	RR	6-18-98
—	C	–	—	PRODUCTION RELEASED	–	–	RR	6-26-98
0750D	D	–	—	C11 & C19 WHERE 4.7uF	JO			

DRAWN BY M. WOOLSEY DATE 3-23-97
CHK'D BY S. ROSS DATE 1APR97
DES. ENG'R R. HURTLE DATE 4-1-97
W. HOWARD DATE 4-1-97
DATE
DATE

FOR MATERIAL AND FINISH SPECIFICATIONS SEE NOTES

DO NOT SCALE DRAWING

BAYER CORPORATION
DIAGNOSTICS DIVISION ELKHART, INDIANA

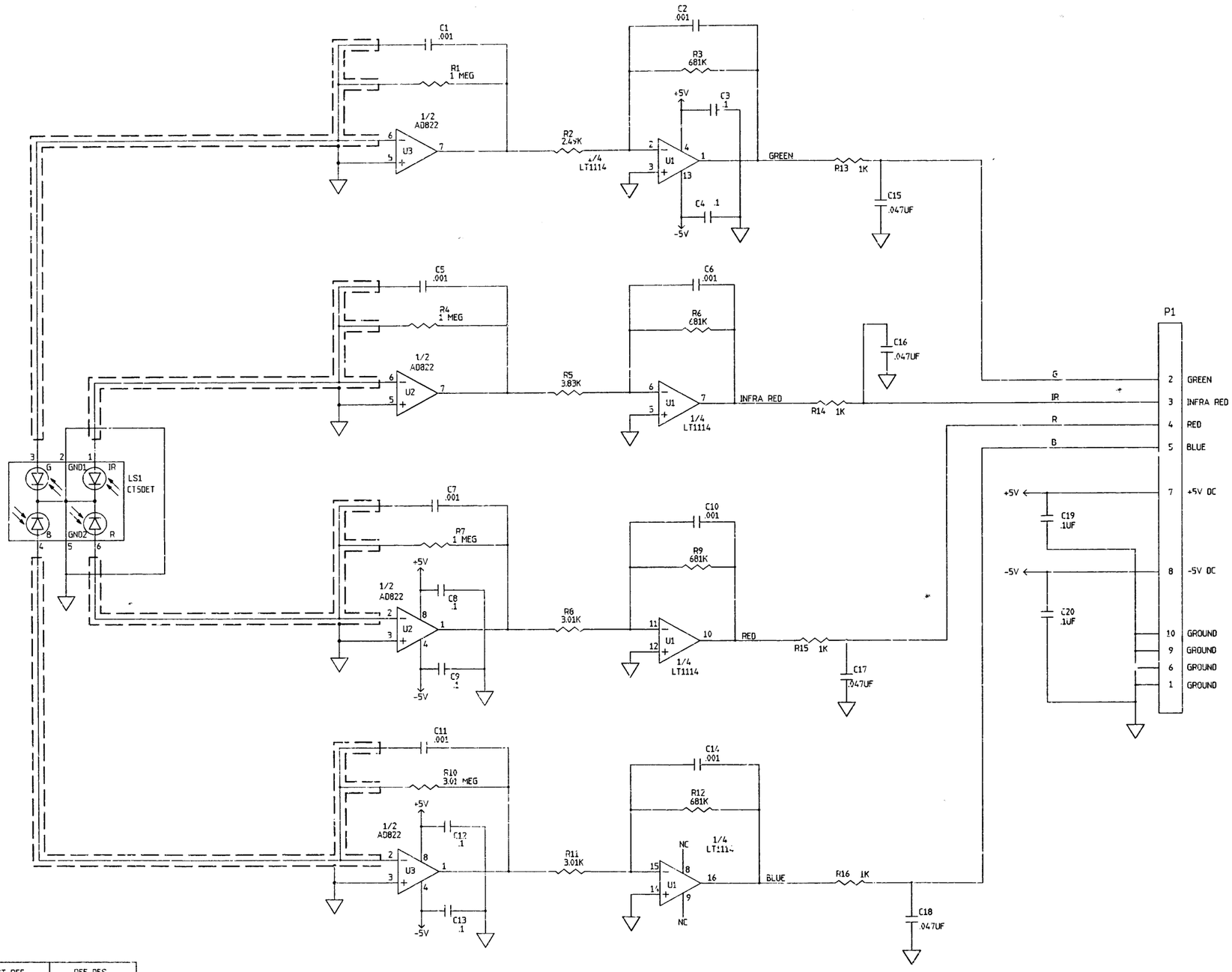
PCN. 6470

PART TITLE
PC SCHEMATIC, PREAMP A/D BD.

SCALE | PART NO. 98400508 | REV D

SHT 1 OF 1

Pre-Amp PCB (Left and Right)



HIGHEST REF DES USED	REF DES NOT USED
R16	
C20	
LS1	
U3	
P1	

NOTES:

1. RESISTOR VALUES ARE EXPRESSED IN OHMS, 1/8W 1% UNLESS OTHERWISE SPECIFIED.
2. CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS UNLESS OTHERWISE SPECIFIED

ECO NO	REV.	SH	ZONE	DESCRIPTION	BY	CHK	APP
—	—	—	—	DEVELOPMENT RELEASED	—	—	RLH
DRC 6372	A	—	—	REVISED VALUES OF GAIN RESISTORS. REVISED CIRCUITRY	MW	KZ	RLH
DRC 6306	B	—	—	ADDED COLORS FOR CHANNELS TIED PINS 1 & 19 TO GROUND ON P1 R2 WAS 2.1K R5 WAS 3.09K R8 WAS 2.55K R10 WAS 3.32 MEG R11 WAS 1.82K	[illegible]	KR	RH
DRC 6780	C	—	—	R2 WAS 1.18K P11 WAS 1.37K	KZ	W Mc	W Mc
DRC 6582	D	—	—	R2 WAS 1.27K R5 WAS 2.43K R8 WAS 1.62K R11 WAS 1.43K	KZ	RR	RR
—	D	—	—	PRODUCTION RELEASED	—	—	//

DRAWN BY M. WOOLSEY DATE 10-23-95
CHK'D BY MPW DATE 7-19-96
DES. ENGR R. HURTLE DATE 7-19-96
DATE
DATE
DATE

FOR MATERIAL AN
FINISH SPECIFICATIO
SEE NOTES

DO NOT SCALE DRAWING

BAYER CORPORATION
DIAGNOSTICS DIVISION ELKHART, INDIANA

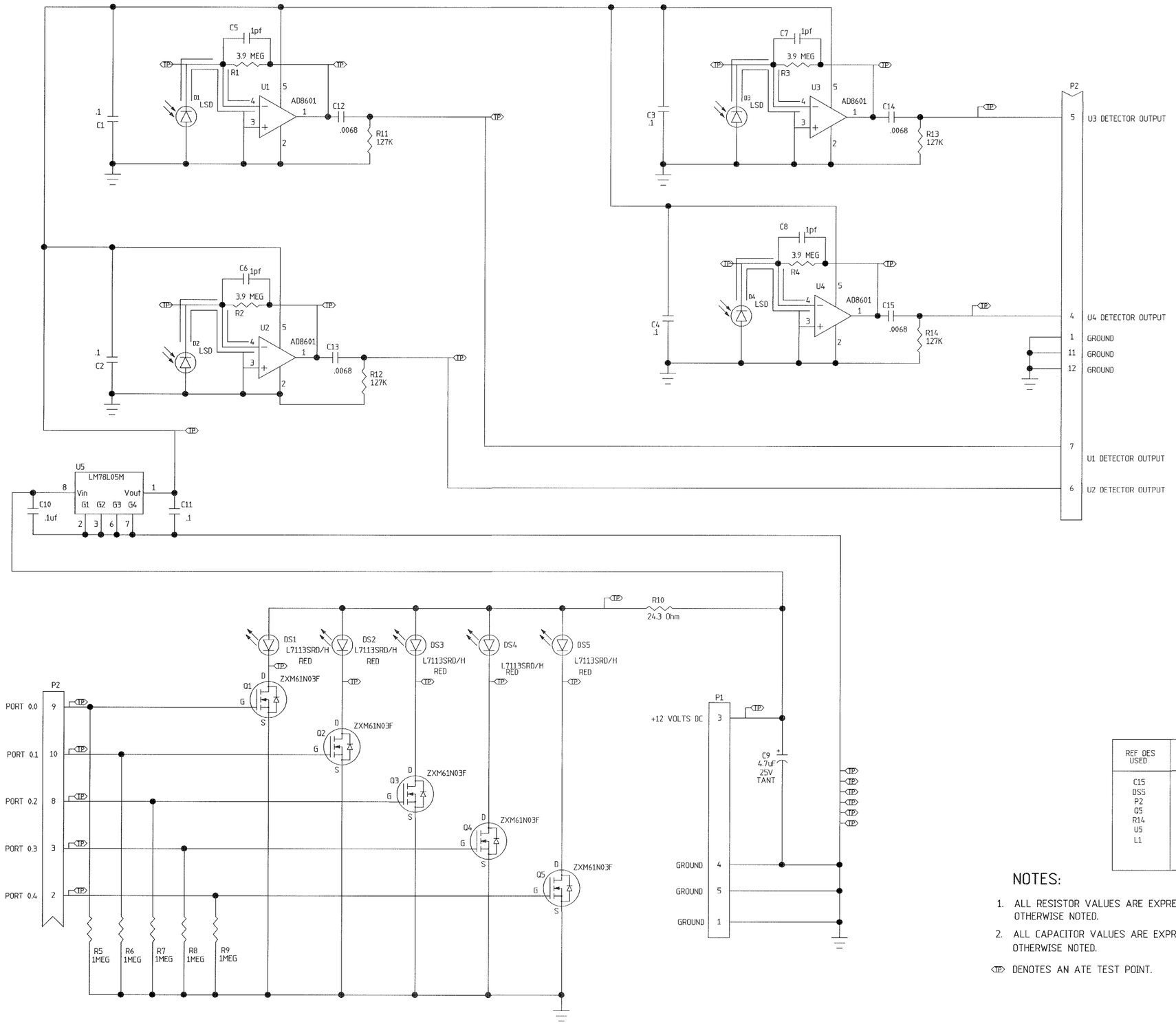
PCN 6470

PART TITLE
PC SCHEMATIC PREAMP

SCALE NONE | PART NO. 98400482

SHT 1

Strip Detector PCB



REF DES USED	REF DES NOT USED
C15 DS5 P2 Q5 R14 U5 L1	

NOTES:

1. ALL RESISTOR VALUES ARE EXPRESSED IN OHMS, 1/8W 5% UNLESS OTHERWISE NOTED.
2. ALL CAPACITOR VALUES ARE EXPRESSED IN MICROFARADS UNLESS OTHERWISE NOTED.

<TP> DENOTES AN ATE TEST POINT.

ECO NO.	REV.	SHT	ZONE	DESCRIPTION	BY	CHK	APP	DATE
EDR 06570	—	—	—		—	—	WH	2/11 2002
DRC 06640	A	—	—	R1, R2, R3 & R4 WHERE 3 MEG	JO	RH	WH	07/09 2002
DRC 06800	B	—	—	1) REMOVED "L1" (7219) 2) ADDED R10	JO	RH	WH	11/18 2002
06940	B	—	—	PRODUCTION RELEASED	—	—	WH	5/15/03

DRAWN BY	R. HURTLE	DATE 07/20/01
CHK'D BY	R. HURTLE	DATE 02/11/02
DES. ENG'R	W.HOWARD	DATE 02/11/02
		DATE
		DATE
		DATE

FOR MATERIAL AND FINISH SPECIFICATIONS SEE NOTES

DO NOT SCALE DRAWING

BAYER CORPORATION
DIAGNOSTICS DIVISION ELKHART, INDIANA

PCN. 6470	PART TITLE PC SCHEMATIC STRIP DETECTOR	
	SCALE NONE	PART NO. 98400528 REV. B
		SHT 1 OF 1

Error Handling

The errors on the Clinitek Advantus analyzer are divided into types:

- General Errors
- Data Set Errors

Understanding Error Codes

A General Error is an error resulting from hardware input, such as a ROM checksum error, a RAM checksum error, a processor 2 programming error, or a sensor error. These errors are detected by processor 2.

Error Numbers Displayed

The Factory Test Mode (FTM) and Customer Mode display only General Errors. Processor 2 generates general errors as a 2-digit number and sends them to processor 1 to display on the screen. For a full listing, refer to *General Error Codes – Cross-referenced*, page 6-3.

Error Numbers Printed

The analyzer prints or sends data set errors with the data sets. The analyzer displays the data set errors in different forms depending upon if you are using the Factory Test Mode or the Customer Mode. When you use the Customer Mode in the analyzer, the error code is printed or displayed on the screen as *N–xx*. This represents the readhead associated with the error and the 2-digit error code.

When you use the Factory Test Mode, the error code, labeled ERRORS, is a 4-digit code. Refer to Figure 6-1 *Factory Test Mode Error Code Sample Output*. The first 2 digits are the error code for the first readhead and the second 2 digits are the error code for the second readhead.

The 2 digits labeled POS are the strip tip locations.

- the first digit is the location of the strip under the first readhead as compared to the first calibration chip
- second digit is the strip tip location under the second readhead as compared to the second calibration chip

Table 6-1 *General Error Codes – Cross-referenced*, in *Error Summary*, page 6-2, is a listing of Data Set error codes and a cross-reference between the error codes generated from the Customer Mode and Factory Test Mode. *General Error Code Descriptions*, page 6-4 is the same list of codes with a description.

The error codes in the sample output in Figure 6-1 *Factory Test Mode Error Code Sample Output* can combine based on column position (for non zero columns) and error code priorities in Table 6-5 *Data Set Errors*.

```
#00008 19940426125800
ERRORS: 0000     POS: 34
COL     A     B     L     CD
      -020 +014 +209 +002
SRV   I    R    G    B    DCD
GLU 787 793 809 074 0744
BIL 737 663 457 124 0900
KET 785 752 685 432 3847
SG  727 692 322 112 5061
pH  125 041 026 067 0562
PRO 618 588 589 767 0790
URO 322 322 316 242 0980
NIT 063 096 053 530 0836
BLO 024 045 056 124 0900
LEU 820 771 560 355 5612
LE1 637 698 876 907 7500
```

Figure 6-1 Factory Test Mode Error Code Sample Output

For example, if the analyzer detects both a skewed strip error on RH 2, Error Code 0009, and a reflectance > 100% error on RH 2, Error Code 0010, the error reported might be 0019. If the analyzer generates a Low Dark Value error for RH 1, Error Code 0100 and a Missing Strip error for RH 2, Error Code 0006, then the error code output would be 0106.

However, if the analyzer generates 2 errors with digits in the same column only the higher priority error is displayed. For example, a Reflectance > 100% error on RH1, Error Code 1000, and an Auto Strip Type error on RH 1, Error Code 2000, the analyzer displays error code 2000 since the Auto Strip Type error at Priority = 9 is a higher priority error then Reflectance, a Priority = 11.

Error Summary

The following tables contain error codes as follows:

- General Error Codes cross-referenced with Customer Errors
- General Errors
- Customer Mode Errors
- Factory Test Mode Errors
- Data Set Errors

Cross-referenced General Error Codes

Table 6-1 General Error Codes – Cross-referenced

Factory Test Mode Error Definition	Code	Customer Card Error Definition
ROM Checksum Error	21	ROM Checksum Error
Table Movement Error	*23	Table Movement Error
Push Bar Movement Error	*24	Push Bar Movement Error
Readhead Scan Movement Error	*25	Readhead Scan Movement Error
Table Not in Place	26	Table Not in Place
Hold-downs Not in Place	*27	Holddowns Not in Place
False Strip Detect	*28	False Strip Detect
Cal Chip NOT Found Error	29	Cal Chip NOT Found Error
Readhead Alignment Error	*30	Readhead Alignment Error
strip detector Setup Error	31	strip detector Setup Error
Strip Centering Error	34	Strip Centering Error
XRAM Factors Error	35	XRAM Factors Error
Calibration Factors Error	36	Calibration Factors Error
Touchscreen Calibration Error	37	Touchscreen Calibration Error
(unassigned)	40	Incorrect Format of Computer Loadlist
(unassigned)	41	Cannot Download Loadlist when not at Ready/Run Screen
(unassigned)	42	Internal printer queue is almost full
(unassigned)	43	External printer queue is almost full
(unassigned)	44	Computer port queue is almost full
(unassigned)	45	Ethernet port queue is almost full
(unassigned)	46	Internal printer queue is full
(unassigned)	47	External printer queue is full
(unassigned)	48	Computer port queue is full
(unassigned)	49	Ethernet port queue is full
(unassigned)	50	Printer error
(unassigned)	*51	Control (QC) results memory is almost full
(unassigned)	*52	Sample results memory is almost full

Factory Test Mode Error Definition	Code	Customer Card Error Definition
(unassigned)	*53	Control (QC) results memory is completely full
(unassigned)	*54	Sample results memory is completely full
(unassigned)	55	Analyzer was unable to store Setup changes
(unassigned)	56-xx	Analyzer error

* *Indicates that these error are checked for and reported only while performing a test
* Refer to *Performing Troubleshooting and Testing*, page 7-1.

Table 6-2 General Error Code Descriptions

Error	Code	Description
ROM Checksum	21	If the calculated checksum for the ROM does not equal 0, then this error is set.
Table Movement	23	The analyzer checks the table sensor for no sensor at 2.5 seconds into the cycle. The table flag should not interrupt the optical sensor. The analyzer checks the table sensor for sensor present after 3.0 seconds in the cycle. The table flag should interrupt the optical sensor. If either condition fails, the analyzer sets the error.
Push Bar Movement	24	The analyzer checks the push bar sensor for no sensor at about 2.5 seconds in the cycle. confirming the push bar is moved. The analyzer checks the push bar sensor for sensor present at about 3.8 seconds confirming the push bar is at the sensor. If either condition fails, the error is set.
Readhead Scan Movement	25	The analyzer set this error in RUN, during readhead position initialization, when the readhead is not positioned on the cal chip as it should be.
Table Not In Place	26	The table sensor is not activated.

Error	Code	Description
Holddowns Not In Place	27	When a strip is read at the first readhead, the reflectance between pads 10 and 11 is checked. This is between the tip of the strip and the calibration chip. If no reflectance reading is below 40%, the error condition is set. **NOTE:** With the hold-downs in place the reflectance is on the order of 15% to 20%R IR and with no hold-downs it is above 80% to 95%R IR.
False Strip Detect	28	If the strip detector detects and verifies a strip but the first readhead does not sense it, this error is set. The readhead senses a strip by checking 2 areas of the strip, between pads 2 and 3 and between pads 9 and 10. If both areas do NOT have a reading >50% R IR, the analyzer sets the false strip detect error.
Cal Chip NOT found	29	During initialization of the readhead position, either at power on or during RUN, the cal chip under readhead 1 could not be found, IR reflectance <50%, by moving IN up to 1000 steps.
Read-head Alignment	30	The stored IR readings for each readhead are tested starting with the 1st IR reading in the read buffer, near the cal chip center. The cal chip edge is defined as the first reading below 50% reflectance and the number of motor steps counted. The position of the cal chip edge for readhead 2 is compared to that of readhead 1. If readhead 2 varies more than ± 3 motor steps, the analyzer sets this error. **NOTE:** During the strip read operation, the analyzer stores readings beginning with position 10, meaning 10 motor steps out from the cal position, and stores a complete set of readings every 4 steps thereafter or every 0.01716 inches.
Strip Detector Setup	31	When the analyzer calibrates the strip detector detection level circuit, if the level count is not between 10 and 254, inclusive, the analyzer sets this error. A high count indicates that too much light is reflecting from the table or that a circuit malfunction is present.

Error	Code	Description
Instrument Factor / Strip Centering	34	This analyzer generates this error when the 2-digit Strip Centering factor is not within the range of 04 to 40 for either readhead or if the difference between the factor for each readhead is greater than 10.
XRAM Factors	35	The checksum for the calibration factors (strip centering) is stored in XRAM does not match the last calculated checksum.
Calibration Factors Error	36	The checksum for the calibration factors (strip centering) stored in the working RAM bank does not match the last calculated checksum and processor 2 has reported an Error 35.
Touchscreen Calibration Error	37	The checksum for the touchscreen calibration values stored in the working RAM bank does not correspond to the last calculated value for the checksum and the calculated value of the checksum for the calibration values received from XRAM does not match the checksum sent by processor 2.

Customer Mode Errors

Table 6-3 Customer Mode Errors

Error	Code	Description
Incorrect Format for Loadlist	40	The loadlist being sent from the Host LIS or HIS analyzer does not comply with the format defined in the Clinitek Communications Standard (CCS). Loadlist contains an invalid character Loadlist contains >200 records (IDs) Loadlist contains <1 record (ID) Any Patient ID has zero characters Any Patient ID has only space characters Any Patient ID contains >13 characters
Cannot Download Loadlist	41	Error occurs if the LIS or HIS Host attempts to send a loadlist to the analyzer when the Ready/Run screen is not being displayed.
Printer Queue Warnings	42-43	Internal (42) and External (43) printer queues reached 90% of capacity a warning is shown prompting the user to check to make sure results are being printed.

Error	Code	Description
LIS Queue Warnings	44-45	Serial (44) and Ethernet (45) queues reached 90% of capacity a warning is shown prompting the user to ensure results are sent to the Host computer.
Printer Queue Warnings	46-47	Internal (46) and External (47) printer queues at full capacity and the user is prevented from testing any further samples until the results are printed or the memory is cleared.
LIS Queue Warnings	48-49	Serial (48) and Ethernet (49) queues at full capacity and the user is prevented from testing any further samples until the results are transferred or the memory was cleared.
Printer Error	50	The external printer has an error, or is out of paper.
Control (QC) Results Almost Full	51	The Controls database has space left for only 10 more results.
Sample Results Almost Full	52	The Sample database has space left for only 10 more results.
Control (QC) Results Full	53	The Controls database is full, no more samples can be tested.
Sample Results Full	54	The Sample database is full, no more samples can be tested.
Setup Information Problem	55	One of the setup information files was found to be corrupted during the data integrity check at power on.
Analyzer Error	56-xx	A serious analyzer error has occurred. The analyzer must be powered off. All communication problems between Processor 1 and Processor 2 are reported as analyzer errors.
	56-39	Error in data received from processor 2
	56-40	Processor 2 communications buffer overrun
	56-41	Processor 2 timeout when message expected from processor 1
	56-42	Processor 2 command fail – no response to message
	56-43	Processor 2 busy response to command
	56-44	Processor 2 programming failure
	56-45	Processor 1 flash write fail
	56-46	Processor 1 flash erase fail
	56-47	Invalid data in database

Error	Code	Description
	56-51	Invalid application image
	56-52	Background ROM check task has found checksum check failures in at least one code bank
	56-53	8051 Stack threshold has been used

Instrument Release Test Errors

Instrument release test errors are only generated when the analyzer is in Factory Test Mode (FTM). FTM is most frequently used when performing a set of tests that must be performed before you can release the analyzer back to the customer.

When you perform the Instrument Release test, the analyzer collects from each readhead and evaluates it against 10 error conditions. In most cases, the analyzer does not find an error and it transmits the data. When the analyzer detects an error during the FTM evaluation, it prints out the appropriate error codes from Table 6-4 *Instrument Release Test Errors* on the analyzers internal printer. When the analyzer detects a data set error, no data is sent to the computer that is using the Release Test Data Collection software.

Table 6-4 Instrument Release Test Errors

Error	Readhead 1	Readhead 2
Low Dark Value	61	81
High Dark Value	62	82
A/D Converter Over Range	63	83
Low Lamp Level	64	84
Low Channel Output	65	85
Missing Strip	Not Applicable	86
Upside-down / Dry Strip	Errors are not checked while the analyzer performs the release test.	
Misaligned Strip	68	88
Skewered Strip	69	89
Reflectance > 100%	70	90
Auto Strip Type Error	Errors are not checked while the analyzer performs the release test.	
Result Data Integrity	Not Applicable	93

Data Set Errors

A Data Set Error is defined as an error detected by analyzing the data collected from the readheads during the read process.

Table 6-5 Data Set Errors

Error	Priority	Generated Error Code		Displayed Error Code	
		RH1	RH2	RH1	RH2
Low Dark value		0100	0001	01-1	01-2
High Dark value		0200	0002	02-01	02-2
Read Overrange		0300	0003	03-1	03-2
Low Lamp Output		0400	0004	04-1	04-3
Low Channel Output		0500	0005	05-1	05-2
Missing Strip		NA	0006	N/A	06-2
Upside-down/Dry Strip		0700	N/A	07-01	N/A
Misaligned Strip		0800	0008	08-1	08-2
Skewed Strip		0900	0009	09-1	09-2
Reflectance >100%		1000	0010	10-1	10-2
Auto Strip Type		2000	NA	20-1	N/A
Strip Type		NA	0020	N/A	20-2
Divide by 0		NA	0030	30-1	30-2

Table 6-6 Error Code Descriptions

Error	Description
Low Dark value	A dark value is < 1 count for any channel after the +200 correction.
High Dark value	A dark value is >= 400 counts on any channel after the +200 correction.
Read Overrange	A-D Converter Overrange. A read value is at full scale, > 2040 counts, on any channel after the +200 correction.
Low Lamp Output	Low Lamp Level. All channels read < 200 counts above dark value at calibration.
Low Channel Output	Low Channel Output. One or more channels on a readhead, but not all, read < 200 counts above dark at calibration.

Error	Description
Missing Strip	The analyzer reads 2 areas of the strip, between pads 2 and 3 and between pads 9 and 10. If either area has a reading < 50%, it is a missing strip error.
Upside-down/Dry Strip	Reflectance reading was > 70% for the GLU pad on the RED channel, Or the reflectance reading was > 76% for the LEU1 pad on the GREEN channel. Both reading are at readhead 1. **NOTE:** This is the only error generated using a pad reflectance.
Misaligned Strip	When doing the strip position correction, the readhead locates the end of the strip nearest the cal chip when the reflectance goes above 30% as the readhead moves toward the front of the analyzer. The analyzer counts steps and assigns a number of 0 through 8 to indicate relative position for each readhead. A relative position of 4 is optimal alignment. A smaller number indicates the strip is closer to the cal chip, a larger number shows it is farther. If the number is 0 or 8, the error code for that readhead is set. The positions 1 through 7 result in correct reflectance for the strip. Each digit indicates a shift of 0.01716 inches so that correct readings are obtained for shifts of ±0.051 inches. **NOTE:** The 2 digits indicating position are output following the error code. The first digit is RH1 and the second is RH2.
Skewed Strip	The analyzer evaluates reflectances in the areas between pads 2 and 3 and between pads 9 and 10 for 12 read positions. If any of the 12 IR reflectance is > 50% at one area but < 50% in the other area, this error is set. **NOTE:** This error is also generated by Step 2 of the LEU decode algorithm.
Reflectance > 100%	The reflectance for any pad on the strip measures more than 100%. This may be due to a bad calibration value.

Error	Description
Auto Strip Type	Japanese language setting only. If the strip type is set to Japan Auto Strip, then the analyzer determines the strip type by checking for the GLU pad (red reflectance <55%) at one of the 2 positions for the 2 supported strip types, -N-MULISTIX SG-L® and URO-HEMACOMBISTIX SG L®. If neither of these were < 55%, this error is set. The analyzer also reports this error code when a loadlist begins with one reagent strip type and the analyzer detects a different reagent strip type during the testing. Although the CT500 supports the auto-detection of the N-MULTISTIX SG-L reagent strip and the URO-HEMACOMBISTIX SG L reagent strip, the CT500 does not support mixing these strip types. A test sequence may only consist of one reagent strip type.
Strip Type	For MULTISTIX 10 SG, MULTISTIX 8 SG, MULTISTIX PRO® 7G, MULTISTIX PRO 10LB, MULTISTIX PRO 10LS and MULTISTIX PRO 11 strips, the analyzer determines that the detected strip matches the expected strip. The analyzer uses readings from both readheads. If the test fails, the error is reported at RH2.
Divide by 0	Processor 2 attempts to divide by zero (0) during any calculation.

Troubleshooting

The section provides information for troubleshooting the Clinitek Advantus analyzer. The section is divided into 3 parts:

- performing troubleshooting tests
- troubleshooting tables based on a description of the problem
- analyzer error codes

Performing Troubleshooting and Testing

The following section describes how to troubleshoot key subassemblies of the Clinitek Advantus analyzer to determine if they are operating properly.

CAUTION: Do not leave power on and be sure to unplug the instrument when performing service unless the procedure requires power.

Troubleshooting the Pre-AMP PCB

You need the following equipment to perform this test:

- digital volt meter
- display extension cable assembly (PN 109456)

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Reconnect the display, using the display extension cable assembly.
3. Reconnect the power cord.
4. Place the analyzer in Factory Test Mode to allow operation during servicing.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
5. Manually position the readhead over the calibration chip.
6. Using the lamp on / off test, turn the lamp on.

   Refer to *Using the Lamp on/Off Option*, page 4-58.
7. Use a DVM to measure the outputs of the 4 channels of the pre-AMP.

   Use connectors P1 and P2 on the A/D PCB to measure these outputs. For information about the A/D PCB, refer to *Replacing the A/D PCB and Pre-AMP PCB*, page 4-38.

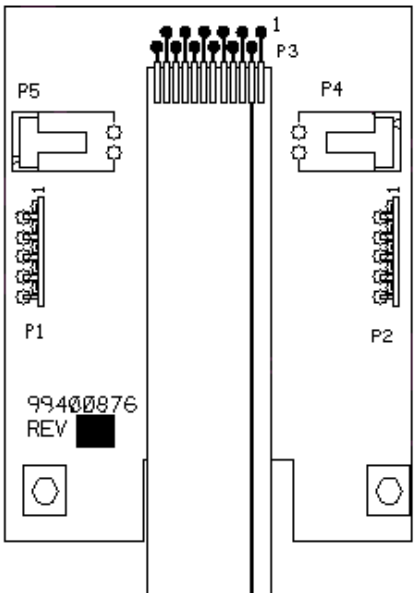


Figure 7-1 Pre-AMP PCBs

8. Place the ground lead on the power supply chassis and measure the output of pins 2, 3, 4, and 5.

   Typical readings are 1 to 4 volts with the lamp on and about 0 with the lamp off. For expected readings, refer to the table below.

	GRN	IR	RED	BLU	Lamp Status
Pin	2	3	4	5	
VDC	1 – 4	1 – 4	1 – 4	1 – 4	on
mVdc	0	0	0	0	off

Troubleshooting the A/D Pre-AMP PCB

The A/D Pre-Amp PCB provides all of the reference voltages to the pre-amp PCBs. Use the following procedure to verify that the Pre-AMP PCBs and lamps have the correct voltages. If any of the voltages are not present, replace the A/D Pre-AMP PCB.

You need the following equipment for this test:

- digital volt meter
- display extension cable assembly (PN 109456)

Testing the A/D Pre-AMP PCB

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Reconnect the display using the display extension cable assembly.
3. Reconnect the power cord and place the analyzer into Factory Test Mode to allow operation during servicing.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
4. Manually position the readhead over the calibration chip.
5. Using the lamp on / off test, turn the lamp on.

   Refer to *Using the Lamp on/Off Option*, page 4-58.
6. Measure the lamp voltage between pins 1 and 2 on both connector P4 and P5.

   The unloaded voltage should be between +5.8 VDC and +6.24 VDC.

   Refer to *Troubleshooting the Pre-AMP PCB*, page 7-1.
7. Reconnect the lamps and measure the loaded voltage.

   Voltages should be between +5.8 VDC and +6.24 VDC.
8. Measure the voltages at pin 7 of connectors P1 and P2.

   Voltages should be +4.95 VDC to +5.05 VDC.
9. Measure the voltages at pin 8 of connectors P1 and P2.

   Voltages should be -5.2 VDC to -4.84 VDC.
10. The following input voltage should be measured on P3:
    - pin 4 should be -12 VDC
    - pins 9 and 10 should be +12 VDC

Troubleshooting the MOTHER PCB – Processor 2

Use this section to test the power and connections to the MOTHER PCB, Processor 2.

Testing the Power Input

You need the following equipment to perform this test:

- digital volt meter or equivalent

- display extension cable assembly (PN 109456)

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. For better access to the end of the connector, disconnect the power supply from the MOTHER PCB, PL15, and unclip the cable assembly from the cable retaining clip.
3. Reconnect the power cord and turn the power on.
4. Measure the output voltage from the power supply at the connector to PL15:

   Refer to Figure 4-2 *Clinitek Advantus with Upper Case Removed*.

   a. Place the NEG lead of a DVM on pin 2 or 3 (GND).

      An alternate ground connection is the case around the power supply.

   b. Place the POS lead on the following pins:

Pin	Voltage	Wire
1	-12 VDC	blue
4 and 5	+5 VDC	red
6	+12 VDC	orange

   The voltage should be within 10% of the listed voltages. No voltage or incorrect voltage may indicate a faulty power supply or power entry module.

Testing Power to the Strip Detector

You need the following equipment to perform this test:

- digital volt meter or equivalent
- display extension cable assembly (PN 109456)

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Reconnect the display using the display extension cable assembly.
3. Reconnect the power cord and place the analyzer into Factory Test Mode to allow operation during servicing.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
4. Check the power to the strip detector on the back of the strip detector PCB, the 5-conductor flex cable.

5. Place the NEG lead of the DVM on Pin 1, 4, or 5, which are GND.

   You can also connect the meter to the power supply chassis for the DC ground.

6. Connect the POS lead of the DVM to Pin 3 of the cable.

   The voltage should be +12 VDC.

7. Connect the POS lead of the DVM to Pin 2 of connector 8.

   The voltage should be -12 VDC.

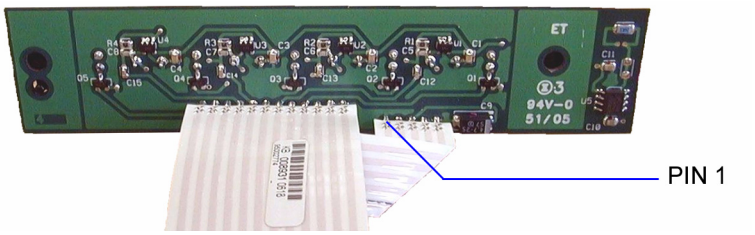


Figure 7-2 Back of the strip detector PCB

Testing Power to the Printer

You need the following equipment to perform this test:

- digital volt meter or equivalent
- display extension cable assembly (PN 109456)

1. Disconnect the line cord from the power entry module.

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

2. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.

3. Reconnect the line cord to the power entry module and turn the power on.

   Connector PL6 on the MOTHER PCB provides the power to the printer.

4. Measure the voltages present at the printer interface PCB:

   a. Connect the NEG lead of the DVM to the chassis of the power supply and the POS lead to the positions shown in Figure 7-3.

      The voltage should be +5.0 VDC at both locations.

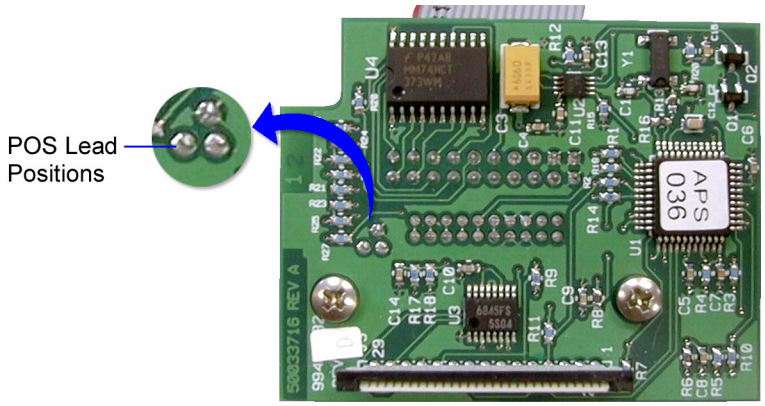


Figure 7-3 Printer Interface PCB

   b. If the voltages are not present, check to see if the power supply is operating or MOTHER PCB is faulty.

      Refer to *Troubleshooting the MOTHER PCB – Processor 2*, page 7-3.

Troubleshooting the RS232 Ports

You need the following equipment to perform this test:

- RJ45 RS232 loop-back connector (PN 106603)
- DB-9 RS232 loop-back connector (PN 133295)

1. Place the analyzer into Factory Test Mode.

   For information about Factory Test Mode, refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.

2. Test the serial ports to determine if the ports work with the loop-back connector.

   Refer to *Using Test Serial Ports*, page 4-56.

3. Repeat the loop back test for each port.
4. If the test fails, replace the MOTHER PCB.
5. If replacing the MOTHER PCB does not resolve the issue, replace the MAIN PCB.

Barcode reader communications

You need the following equipment to perform this test:

- DB-9 RS232 loop-back connector (PN 133295)

- digital volt meter
- keyboard/barcode loop-back connector (PN 106666)

1. Enter Factory Test Mode.

   For information about Factory Test Mode, refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
2. Select **INSTRUMENT TEST**.
3. Select **LEVEL 2 TESTS**.
4. Select **TEST SERIAL PORTS**.

   Refer to *Using Test Serial Ports*, page 4-56.
5. Using the keyboard/barcode loop-back connector, measure the voltage at connector J5.

   The voltage between pin 4 and ground, pin 3, should be +5 VDC.
6. If the voltage is not present, replace the MOTHER PCB.
7. Use the barcode test port fixture and test the barcode reader communications test.

   Refer to *PS2 Port (Barcode / Keyboard)*, page 4-63.
8. If the test passes, the problem is with the barcode reader.
9. If the test fails, replace the MOTHER PCB and retest.

Troubleshooting the Sensors

You need the following equipment to perform this test:

- digital volt meter or equivalent
- display extension cable assembly (PN 109456).

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Reconnect the display using the display extension cable assembly.
3. Reconnect the power cord and place the analyzer into Factory Test Mode to allow operation during servicing.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
4. Select **INSTRUMENT TEST**.
5. Select **SENSOR STATUS**.
6. Interrupt each of the sensors and observe that the status changes.

   Refer to *Using the Sensor Status Screen*, page 4-52.

7. If the status fails to change replace the sensor and perform the test a second time.
8. If the sensor test fails a second time, troubleshoot the MAIN PCB and the MOTHER PCB.

   Refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9 or *Troubleshooting the MOTHER PCB – Processor 2*, page 7-3.

Troubleshooting the Display

You need the following equipment to perform this test:

- digital volt meter or equivalent
- display extension cable assembly (PN 109456).

CAUTION: Do not remove the upper case of the analyzer until you take Standard Electrostatic Discharge (ESD) precautions.

1. Remove the upper case.

   Refer to *Removing the Upper Case*, page 4-11.
2. Reconnect the display using the display extension cable assembly.
3. Reconnect the power cord and place the analyzer into Factory Test Mode to allow operation during servicing.

   Refer to *Accessing the Factory Test Mode (FTM)*, page 4-50.
4. Perform the Test Display test.

   If the display fails this test, proceed to the next step.

   Refer to *Using the Test Display Option*, page 4-58
5. Verify that the display assembly is receiving power:
   a. Remove the Display bezel assembly from the analyzer leaving the cable connected to MOTHER PCB.
   b. Using a volt meter check for voltage at the end of the display power cable assembly while the analyzer power is on.
6. Connect the NEG lead of the volt meter to the power supply chassis and connect the POS lead to pins 1, 5, and 6.

   The voltage measured on each of these pins should be +3.3, +5, and +12 VDC respectively. Pins 2 and 3 are ground.
7. If the voltages are not present on the display, check the connector on MOTHER PCB for the voltages.

   This may indicate a bad power cable assembly or MOTHER PCB.
8. If the voltage is present on the MOTHER PCB and at the end of the Power cable assembly, replace the display assembly.

Troubleshooting the MAIN PCB – Processor 1

You need the following equipment to perform this test:

- digital volt meter or equivalent
- display extension cable assembly 109456
- known good display assembly

Use *Troubleshooting the Display*, page 7-8 for voltage testing at the MAIN PCB.

Because user interface functions are controlled by processor 1, the MAIN PCB, and motor control functions are controlled by processor 2, MOTHER PCB, it is possible to isolate problems to either processor 1 or processor 2.

1. If on power up the motor does not move from the readhead, the moving table, or the blotter, replace the MOTHER PCB.

   Refer to *Replacing the MOTHER PCB*, page 4-31.

2. If the display is blank when the power is turned on, check the power supply for proper output voltage.

   Refer to *Testing the Power Input*, page 7-3.

3. Check the cables going to the display also, to see if they are seated properly, then check the voltage to the display.

   Refer to *Troubleshooting the Display*, page 7-8.

4. If a known good display fails to operate, replace the MAIN PCB.

   Refer to *Replacing the MAIN PCB*, page 4-14.

Troubleshooting General Analyzer Problems

The first 2 columns of the troubleshooting table are similar to those found in the Troubleshooting Section of the Operator's Guide. The third column, labeled "Service Remedy" contains more advanced troubleshooting. Only trained service personnel should perform or oversee these actions. The items in the third column are listed in increasing order of technical difficulty.

Display is blank

Possible Cause	Customer Remedy	Service Remedy
No power	1. Listen for the fan. 2. If it is not functioning, turn the analyzer power off. 3. Check that the power cord is firmly plugged into the analyzer and into a live AC electrical outlet. 4. Turn the power on.	Remove the Bezel Assembly and check that all cables are properly seated. For information, refer to *Replacing the Display Bezel*, page 4-12. Verify input and output voltages to the power supply as in *Testing the Power Input*, page 7-3.

Fixed Platform Cannot be Installed

Possible Cause	Customer Remedy	Service Remedy
The Moving Table is not in the lowest position.	1. Turn power on and let the analyzer initialize. 2. Switch the power off. 3. Repeat 3 times.	1. Inspect the Fixed and Moving Tables for damage. 2. Using the Factory Test Mode, test the drive housing and stepper motor for proper operation. Refer to *Troubleshooting the RS232 Ports*, page 7-6.

Printout Does Not Contain All Reports

Possible Cause	Customer Remedy	Service Remedy
Missing reports are flagged for confirmatory report and Edit flagged result is on.	The analyzer displays the list of flagged reports when it completes the analysis and then prints the report after exiting the End-of-Run Report screens.	Perform printer tests using the Factory Test Mode. Refer to *Using the Read A-D Counts Option*, page 4-58.

Push Bar Does Not Move to the Right

The push bar does not move to the right after you place a strip onto the platform.

Possible Cause	Customer Remedy	Service Remedy
The analyzer is moving other strips along the platform.	Allow up to 7 seconds to elapse before movement of the push bar. The time lapse depends upon the timing cycle for movement of the strips across the platform.	Verify that the strip detector LEDs are turning on.
Strip detector problem.	1. At the Ready/Run screen, and with the tests complete, turn the analyzer power off. 2. Wait several seconds and turn it back on. If the problem continues, contact your local technical support provider or distributor.	1. Verify that the customer's analyzer is in the Ready/Run state. 2. Check that the cable from the push arm motor is seated into connector PL5 on the MOTHER PCB. Use the Factory Test Mode to check operation. Refer to *Performing the Cycle Pusher Arm Test*, page 4-66. Verify strip detector operation. Refer to *Using the Test Strip Detector Option*, page 4-57. Verify that the strip detector has correct voltages. Refer to *Testing Power to the Strip Detector*, page 7-4. Replace the strip detector. Refer to *Installing the Strip Detector*, page 4-36. Troubleshoot the MAIN PCB for a broken trace and replace it if necessary. Refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9.

Push Bar Does Not Move Back to the Left

The push bar does not move back to the left after moving a strip, other than at the end of a load-listed or while waiting for entry of an ID.

Possible Cause	Customer Remedy	Service Remedy
The operator places the last strip in a loadlist or the analyzer is waiting for entry of an ID.	The analyzer is functioning properly. After the current loadlist is complete, begin a new loadlist or enter the ID number.	If this occurs repeatedly or occurs with non-dark urines, verify proper strip detector operation as outlined below. Verify that the strip detector LEDs are turning on. Use the Factory Test Mode to check operation. Refer to *Performing the Cycle Pusher Arm Test*, page 4-66.
You are testing a very dark urine and the strip detector is unable to verify the presence of the strip until it reaches the first readhead.	Presence of the strip is verified at the first readhead, requiring an additional 3 cycles (21 seconds). The push bar should then move back to the left. Continue testing in the normal manner.	Verify strip detector operation. Refer to *Using the Test Strip Detector Option*, page 4-57. Verify that the strip detector has correct voltages. Refer to *Testing Power to the Strip Detector*, page 7-4. Replace the strip detector. For information, refer to *Replacing the Strip Detector*, page 4-34. Troubleshoot the MAIN PCB for a broken trace and replace if necessary. Refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9. Check that the cable from the push bar motor is seated into connector PL5 on the MOTHER PCB. Defective push bar mechanism – troubleshoot. Refer to*Performing the Cycle Pusher Arm Test*, page 4-66 or *Replacing the Crank Arm*, page 4-44.

Push Bar Moves to the Right

The push bar moves to the right when it should not. A strip has not been placed on the platform.

Possible Cause	Customer Remedy	Service Remedy
The strip detector was accidentally triggered by a hand, sleeve, or other foreign object.	The push bar moves back to the left after 3 cycles (21 seconds). Continue testing in the normal manner. Do not place your hand or other objects on the platform, because these can be mistaken for a reagent strip.	Verify that the strip detector LEDs are turning on. Use the FTM to check operation. Refer to *Performing the Cycle Pusher Arm Test*, page 4-66. Verify strip detector operation. Refer to *Performing the Strip Detector Test*, page 4-65.
Ambient light has changed significantly Strip detector problem.	1. Complete all analysis. 2. Clear the strip loading station of all strips and foreign objects. 3. At the Run/Ready screen, turn the analyzer power off. 4. Wait several seconds, then turn it back on to recalibrate the strip detector. If the problem continues, contact your local technical support provider or distributor	Verify that the strip detector has correct voltages. Refer to *Testing Power to the Strip Detector*, page 7-4. Replace the strip detector. Refer to *Replacing the Strip Detector*, page 4-34. Troubleshoot the MAIN PCB for a broken trace and replace if necessary. For information, refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9.

Internal Printer

Possible Cause	Customer Remedy	Service Remedy
No power to the printer.	Contact your local technical support provider or distributor.	Verify that the internal printer has power. For information, refer to *Testing Power to the Printer*, page 7-5.
No paper installed in printer.	Install a new roll of paper as instructed in the Operator's Guide Chapter 5, *Changing the paper*.	Perform printer tests using the Factory Test Mode on both internal and external printers. For information, refer to *Using Test Printers*, page 4-56.
Paper is installed backwards or you are using the incorrect paper.	Remove the paper and reinstall it according to the directions in the Operator's Guide. Use only Bayer HealthCare thermal printer paper.	Clean internal printer platen with isopropyl alcohol and cotton tip applicator or equivalent. For information, refer to *Cleaning the Printer*, page 4-7.
Loose electrical connection to the printer.	Carefully remove and reinstall the interface cable to the printer.	Replace the internal printer. For information, refer to *Replacing the Internal Printer*, page 4-19.
		Replace the printer interface PCB. For information, refer to *Replacing the Internal Printer*, page 4-19.
Defective printer.	Run the printer test. If it does not print correctly, contact your local technical support provider or distributor.	Replace the MOTHER PCB. For information, refer to *Replacing the MOTHER PCB*, page 4-31.

Touchscreen

Possible Cause	Customer Remedy	Service Remedy
Defective screen.	Contact your local technical support provider or distributor	Reset analyzer to default settings. Refer to the Reference Operator's Guide, chapter 8.

Possible Cause	Customer Remedy	Service Remedy
		Remove the Bezel Assembly and check that all cables are properly seated. For information, refer to *Replacing the Display Bezel*, page 4-12.
		Verify input and output voltages to the power supply. For information, refer to *Testing the Power Input*, page 7-3.
		Troubleshoot the touch screen. For information, refer to *Troubleshooting the Display*, page 7-8.
		Troubleshoot the MAIN PCB. For information, refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9.

Loadlist Does Not Transfer

The loadlist does not transfer from the host computer or LIS.

Possible Cause	Customer Remedy	Service Remedy
The load list contains other data as well as IDs.	Ensure that the loadlist contains only IDs.	Reload the software.
The data for transfer has less than 1 ID or more than 200 IDs.	Ensure that the loadlist has at least 1 and no more than 200 IDs.	
The list contains an ID that has more than 13 characters.	Ensure that the loadlist contains no IDs with more than 13 characters.	

Possible Cause	Customer Remedy	Service Remedy
The data includes characters that cannot be transferred. The characters that can be transferred are those within ASCII code range 0032 to 0126, with the exception of these characters: & \ ^ |.	Ensure that the loadlist uses only characters that can be transferred.	
A loadlist is in progress or the analyzer is not displaying the Ready/Run screen when the loadlist is downloaded.	Allow all tests in the current loadlist to complete and the analyzer to return to the Ready/Run screen.	
A loadlist has already been downloaded and not all tests have completed.	Complete all tests on the current loadlist before transferring another loadlist. When the problem that caused the loadlist to fail is removed, send the loadlist to the analyzer.	
	Check that the host is connected to the analyzer's Serial port or Ethernet port.	Reload the software. Replace the MOTHER PCB. For information, *Replacing the MOTHER PCB*, page 4-31.
	Confirm port settings and that the port is turned on and make appropriate changes.	Replace the MAIN PCB. For information, refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9.

Analyzer Error Codes

Analyzer error codes are listed by number in this section.

Error 01, 02, 03, 04 and 05

Possible Cause	Customer Remedy	Service Remedy
analyzer optical error.	1. Turn the analyzer power off. 2. Wait several seconds, then turn it back on.	Problem with the Pre-AMP or A/D Pre-AMP PCB. Troubleshoot Readhead subassembly. Refer to *Troubleshooting the Pre-AMP PCB*, page 7-1 or *Troubleshooting the A/D Pre-AMP PCB*, page 7-2. Replace BOTH Lamps. Refer to *Replacing the Lamp Assembly*, page 4-36. Replace Pre-AMP. Refer to *Replacing the A/D PCB and Pre-AMP PCB*, page 4-38. Replace A/D Pre-AMP PCB. Refer to *Replacing the Pre-AMP PCBs*, page 4-40.

Error 06 – 2

Possible Cause	Customer Remedy	Service Remedy
A reagent strip that had been detected at the first readhead was not detected at the second readhead.	1. Select the **Return to Ready/Run** button to cancel the current tests and return to the Ready/ Run screen. 2. Turn the analyzer off. 3. Remove Push Bar and the fixed platform to locate the strip. 4. Check the pins on the Moving Table to ensure that none are bent or broken. 5. Perform the Daily Cleaning Procedure as in the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 6. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available. 7. Retest those specimens.	Verify that the fixed platform is seated correctly. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. Verify that the moving table is seated correctly. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. Perform strip walk test. Refer to *Performing the Strip Walk Test*, page 4-67. Replace the drive housing. Refer to *Replacing the Drive Housing*, page 4-41. Replace the fixed platform and moving table. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. Replace table guides. Refer to *Replacing the Table Guide-Left*, page 4-21 and *Replacing the Table Guide-Right*, page 4-23.

Error 07 – 1

Possible Cause	Customer Remedy	Service Remedy
A reagent strip either is not fully wetted or is upside-down on the platform.	If the error is because of an upside-down strip, perform the following steps: 1. Remove and clean the Push Bar, Fixed Platform, Holddown and Moving Table. For information, refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 2. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available. 3. Retest the appropriate specimen, ensuring that the strip is dipped completely into the specimen and is placed onto the platform with the pads facing up.	Inspect Push Bar, fixed platform and Holddown, and moving table for physical damage. Replace as necessary. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*.

Error 08 – 1 and 08 – 2

Possible Cause	Customer Remedy	Service Remedy
A Reagent Strip is misaligned during processing due to the tip of the strip moving closer to the cal chip or farther away from the cal chip. This error indicates that a strip position correction factor of 0 or 8 was determined for readhead 1 or readhead 2.	1. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available. 2. For Error 08-1, retest those specimens, ensuring that the end of the strip is placed against the back wall of the platform and not touching the bottom of the strip loading station. 3. If the error repeats, remove and clean the push bar, fixed platform, holddown, and moving table. For information, refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 4. Check the moving table to ensure that no pins are bent or broken, then reinstall the parts. 5. Make sure that the tables are fully seated and that the holddown is snapped into place.	Inspect Push Bar, fixed platform and Holddown, and Moving Table for physical damage. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.* Make sure that the analyzer is level and replace any rubber feet that appear worn or missing. Verify that the fixed platform and moving table are seated correctly. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.* Perform strip walk Test. Refer to *Performing the Strip Walk Test*, page 4-67. Realign horizontal plate. Refer to *Realigning the Horizontal Plate*, page 4-6. Replace drive housing. Refer to *Replacing the Drive Housing*, page 4-41. Replace the fixed platform and moving Table. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.* Replace the table guides. Refer to Refer to *Replacing the Table Guide-Left*, page 4-21 and *Replacing the Table Guide-Right*, page 4-23. Check that the drive housing flags are positioned in the sensors. Refer to *Adjusting the Sensors*, page 4-8.

Error 09 – 1 and 09 – 2

Possible Cause	Customer Remedy	Service Remedy
A Reagent Strip becomes skewed during processing	1. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available.	For Error 09-1, have the customer determine if reagent strips have stacked up near the outfeed area in the waste bin. If so, clear any jams and push strips to the right in the waste bin to clear the outfeed area.
	2. Retest those specimens, ensuring that the end of the strip is placed against the back wall of the platform and not touching the bottom of the strip loading station.	Inspect the push bar, fixed platform and holddown, and moving table for physical damage. Replace as necessary. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.*
	3. If the error repeats, remove and clean the Push Bar, moving table, Fixed Platform, Holddown. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*.	Ensure that the analyzer is level and replace any rubber feet that appear worn or are missing. Verify that the fixed platform and moving table are seated correctly. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.*
	4. Check the Moving Table to ensure that no pins are bent or broken.	Perform strip walk test. Refer to *Performing the Strip Walk Test*, page 4-67.
	5. Reinstall the parts.	Realign horizontal plate. Refer to *Realigning the Horizontal Plate*, page 4-6.
	6. Make sure that the tables are fully seated and that the Holddown is snapped into place.	Replace drive housing. Refer to *Replacing the Drive Housing*, page 4-41. Replace the fixed platform and moving table. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.* Replace the table guides. Refer to *Replacing the Table Guide-Left*, page 4-21.

Possible Cause	Customer Remedy	Service Remedy
		Check that the drive housing flags are positioned in the sensors. Refer to *Adjusting the Sensors*, page 4-8.

Error 10 – 1 and 10 – 2

Possible Cause	Customer Remedy	Service Remedy
analyzer optical error	1. Turn the analyzer power off. 2. Remove and clean the Fixed Platform, taking care to carefully clean the calibration bars. For information, refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 3. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available. 4. Retest those specimens.	Troubleshoot Pre-AMP subassembly. Refer to *Troubleshooting the Pre-AMP PCB*, page 7-1. Replace Pre-AMP. Refer to *Replacing the A/D PCB and Pre-AMP PCB*, page 4-38.

Error 20 – 1

NOTE: This error only applies to units using Japanese language UI.

Possible Cause	Customer Remedy	Service Remedy
Auto Detect is selected in Setup and the analyzer was not able to automatically detect the strip type.	1. Ensure that you are using a recognized strip type. 2. Retest the specimen using a new strip. If the error continues to occur, contact your local technical support provider or distributor.	Troubleshoot Pre-AMP subassembly. Refer to *Troubleshooting the Pre-AMP PCB*, page 7-1. Replace Pre-AMP. Refer to *Replacing the A/D PCB and Pre-AMP PCB*, page 4-38.

Error 21

Possible Cause	Customer Remedy	Service Remedy
Internal memory error	1. Turn the analyzer power off. 2. wait several seconds, then turn it back on.	Reprogram analyzer. Replace MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14. Replace MOTHER PCB Refer to *Replacing the MOTHER PCB*, page 4-31.

Error 23

Possible Cause	Customer Remedy	Service Remedy
Moving table is misaligned.	1. Turn the analyzer power off. 2. Check to see if the moving table is installed. 3. Inspect the analyzer for any obvious signs of misalignment or incorrect installation of the moving table or fixed platform. 4. Remove and reinstall the fixed and moving table. For information, refer to the *Operator's Guide* Chapter 5, *Performing the Daily Cleaning*. 5. Turn the power on.	Inspect drive housing and fixed platform guides for wear or damage. Replace as necessary. Refer to *Replacing the Table Guide-Left*, page 4-21 and *Replacing the Drive Housing*, page 4-41. Verify that the moving table is aligned correctly. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning.* Verify that the moving table optical sensor operate correctly. Refer to *Adjusting the Sensors*, page 4-8.
analyzer mechanical error	Contact your local technical support provider or distributor.	Check stepper motor drive circuits for proper operation Refer to *Troubleshooting the RS232 Ports*, page 7-6. Use FTM to cycle motors. Refer to *Using Level 4 Tests*, page 4-60. Replace MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31.

Error 24

Possible Cause	Customer Remedy	Service Remedy
Misalignment or incorrect installation of the push bar or fixed platform. Push bar is not finding home in the proper time.	1. Turn the analyzer off. 2. Inspect the analyzer for any obvious signs of misalignment or incorrect installation of the push bar or fixed platform. 3. Remove and reinstall any misaligned parts. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 4. Turn the analyzer on.	Verify that optical sensor operate correctly. Refer to *Troubleshooting the Sensors*, page 7-7. Check stepper motor drive circuits for proper operation. Refer to *Troubleshooting the RS232 Ports*, page 7-6. Use FTM to cycle motor. Refer to *Using Level 4 Tests*, page 4-60.
analyzer mechanical error	Contact your local technical support provider or distributor.	Clean Push Bar Shaft and lubricate. Refer to the *Operator's Guide* Chapter 5, *Performing the Daily Cleaning*. Replace MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31. Check to see that left-hand Pre-AMP PCB is not hitting any of the mechanical assemblies as the readheads move back and forth while cycling all motions. If it is hitting, carefully loosen the screw holding the Pre-AMP, lift up on the back end of the PCB and retighten the screw.

Error 25

Possible Cause	Customer Remedy	Service Remedy
Readhead could not find the cal chip.	1. Turn the analyzer power off. 2. Inspect the analyzer for any obvious signs of misalignment or incorrect installation of the Fixed Platform, or Holddown. 3. Remove and reinstall any misaligned parts as in the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 4. Turn the power on.	Perform 3 on/off cycles of the analyzer power, ignoring any errors received prior to the 3rd cycle. Check to see that left-hand Pre-AMP PCB is not hitting any of the mechanical assemblies as the readheads move back and forth while cycling all motions. If it is hitting, carefully loosen the screw holding the Pre-AMP, lift up on the back end of the PCB and retighten the screw.
analyzer mechanical error	Contact your local technical support provider or distributor	Check that the A/D Pre-AMP flex cable is fully seated in connector PL10 on the MOTHER PCB. Insure that flex cables are fully seated in the connectors on the Pre-AMP PCBs and that the lamp cables are locked in place on the A/D Pre-AMP PCB. Verify that the lamps operate and replace, if necessary. Refer to *Using the Lamp on/ Off Option*, page 4-58 and *Replacing the Lamp Assembly*, page 4-36. Test Pre-AMP operation by positioning readheads over cal chips and obtaining A/D counts. Refer to *Using the Read A-D Counts Option*, page 4-58. Replace Pre-AMP. Refer to *Replacing the Pre-AMP PCBs*, page 4-40.

Possible Cause	Customer Remedy	Service Remedy
		Check stepper motor drive circuits for proper operation. Refer to *Troubleshooting the RS232 Ports*, page 7-6.
		Use FTM to cycle motors. Refer to *Using Level 4 Tests*, page 4-60.
		Replace the MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31.

Error 26

Possible Cause	Customer Remedy	Service Remedy
fixed platform is missing or not installed properly.	Install the table and platform, if they are missing. If they are already installed, carefully push in on the sides of the platform to make sure it is fully engaged. If the error continues, remove and reinstall the platform and perform cleaning. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*.	Inspect drive housing and fixed platform guides for wear or damage. Replace as necessary Refer to *Replacing the Table Guide-Left*, page 4-21 and *Replacing the Drive Housing*, page 4-41. Verify that all connectors are seated into the MOTHER PCB. Use FTM to test individual sensors. Refer to *Troubleshooting the Sensors*, page 7-7. Confirm that the fixed platform enters the photo sensor on the table guide. Refer to *Adjusting the Sensors*, page 4-8. Replace sensor, as necessary. Refer to *Replacing the Baseplate Mechanism*, page 4-45. Replace MOTHER PCB, if defective. Refer to *Replacing the MOTHER PCB*, page 4-31. Replace MAIN PCB, if defective. Refer to *Replacing the MAIN PCB*, page 4-14.

Error 27

Possible Cause	Customer Remedy	Service Remedy
Holddown is improperly installed, or missing, or is dirty.	1. Select the **Return to RUN/READY** button to cancel the current tests. 2. Remove the Fixed Platform. 3. Install the Holddown if missing, or clean if it appears dirty. 4. Reinstall the Holddown, ensuring it is properly installed. 5. Replace the platform onto the analyzer. If the Holddown is damaged or discolored, replace it with a new holddown. 6. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine the specimen(s) for which no results are available and retest those specimens. Refer to the *Clinitek Advantus Operator's Guide*, Chapter 5, *Maintenance*.	Refer to *Error Summary*, page 6-2. Inspect fixed platform and holddown for wear and discoloration. Replace as necessary. Refer to the *Clinitek Advantus Operator's Guide*, Section 5, *Performing the Daily Cleaning*. Verify Readhead performance and alignment. Refer to the *Clinitek Advantus Operator's Guide*, Chapter 5, *Maintenance*.

Error 28

Possible Cause	Customer Remedy	Service Remedy
A reagent strip that was detected, as being placed on the platform, was not detected at the first readhead.	If a strip was never placed or was removed after being placed, perform the following steps: 1. Check your printout of results, or the Results Error Report displayed at the end of the current tests, to determine if a result set is missing and, 2. Retest the specimen.	Refer to *Error Summary*, page 6-2. Using the FTM, confirm strip detector operates properly. Refer to *Performing the Strip Detector Test*, page 4-65. Verify that the cables coming from the strip detector are properly seated into the MOTHER PCB, PL9 and PL11.
	Be sure you do not place your hand or other objects on the strip loading station, as these can be mistaken for a Reagent Strip. 1. If the error occurs repeatedly, turn the analyzer off. 2. Wait several seconds, then turn it on. This recalibrates the strip sensor.	Replace the strip detector. Refer to *Replacing the Strip Detector*, page 4-34. Using the FTM, perform reflectance test to check for proper readhead performance. Refer to *Using the Reflectance Test*, page 4-59.
	If a strip was present, perform the following steps 1. Remove and clean the moving table, fixed platform, holddown. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 2. Reinstall the parts.	Replace Pre-AMP PCB. Refer to *Replacing the Pre-AMP PCBs*, page 4-40.
Moving table is not installed.	1. Remove the fixed platform and check for the presence of the moving table. 2. Install the moving table, if necessary.	

Error 29

Possible Cause	Customer Remedy	Service Remedy
Calibration bar error	1. Turn the analyzer power off. 2. Remove the fixed platform and inspect the calibration bars for damage or misalignment. 3. Clean the platform and calibration bars and reinstall the platform. Refer to the *Operator's Guide*, Chapter 5, *Performing the Daily Cleaning*. 4. Turn the power back on.	Refer to *Error Summary*, page 6-2. Make sure that the customer has installed the fixed platform completely, to the stops. Cycle the analyzer power on/off 3 times, ignoring any errors reported prior to the 3rd cycle. Check for damage to the fixed platform cal chips. Use the FTM to verify the stepper motor drive operation for readhead carrier and that carrier is moving with the belt *Troubleshooting the RS232 Ports*, page 7-6 and *Using the Read Strip, Dump Data Test*, page 4-60. Remove the upper case and verify that all connectors (signal and lamp) on the Pre-AMP PCB and A/D Pre-AMP PCB are fully seated. Verify that the lamps turn on. Use FTM to verify operation of Pre-AMPs and A/D Pre-AMP PCB. *Troubleshooting the Pre-AMP PCB*, page 7-1, *Troubleshooting the A/D Pre-AMP PCB*, page 7-2 and *Using the Lamp on/Off Option*, page 4-58.

Error 30

Possible Cause	Customer Remedy	Service Remedy
analyzer mechanical error readhead alignment error	Contact your local technical support provider or distributor.	Refer to *Error Summary*, page 6-2. Make sure that the customer has installed the fixed platform completely, to the stops. Check alignment of readheads. Refer to *Aligning the Readhead*, page 4-4. Check for proper operation of Pre-AMPs and A/D Pre-AMP PCB. Refer to *Replacing the A/D PCB and Pre-AMP PCB*, page 4-38.

Error 31

Possible Cause	Customer Remedy	Service Remedy
analyzer mechanical error strip detector Set Up Error	Contact your local technical support provider or distributor.	Refer to *Error Summary*, page 6-2. Make sure that the customer has installed the fixed platform completely. Verify strip detector operation. Refer to *Performing the Strip Detector Test*, page 4-65.

Error 34

Possible Cause	Customer Remedy	Service Remedy
analyzer mechanical error Strip Centering Error / analyzer factor error	Contact your local technical support provider or distributor.	Refer to *Error Summary*, page 6-2. Make sure that the customer has installed the fixed platform completely, to the stops. Perform strip centering test. Refer to *Setting up Strip Centering Tests*, page 4-66.

Error 36

Possible Cause	Customer Remedy	Service Remedy
Both analyzer memories for calibration parameters are corrupt.	1. Turn the analyzer power off. 2. Wait several seconds, then turn it back on.	Troubleshoot the MAIN PCB. Refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9. Replace MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Error 37

Possible Cause	Customer Remedy	Service Remedy
Touchscreen calibration error	Follow the instructions for calibrating the touchscreen as in the Operator's Guide Chapter 5. 1. If the error repeats, turn the analyzer's power off. 2. Wait several seconds, then turn it back on. Contact your local technical support provider or distributor	Reset the analyzer to default settings as in the *Operator's Guide*, chapter 8. Remove the Bezel Assembly and check that all cables are properly seated. Refer to *Removing the Display Bezel*, page 4-12. Verify input and output voltages to the power supply. Refer to *Testing the Power Input*, page 7-3. Troubleshoot the touchscreen. Refer to *Testing the Display*, page 4-65. Troubleshoot the MAIN PCB. Refer to *Troubleshooting the MAIN PCB – Processor 1*, page 7-9.

Error 40

Possible Cause	Customer Remedy	Service Remedy
Not an assigned error for the customer software. Communications error between processor 1 and processor 2.	Verify that the proper software is installed.	Replace MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14. Replace MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31.

Error 50

Possible Cause	Customer Remedy	Service Remedy
Printer error	Check that your external printer is turned on and is on-line. Verify that both ends of the interface cable are securely connected and check that your printer has paper.	Re-verify proper installation of interface cable. Possible defective Printer Interface PCB. Refer to sections *Using Test Printers*, page 4-56 and *Replacing the Internal Printer*, page 4-19. Possible defective external printer cable. Possible defective MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31. Possible defective MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Errors 51 and 52

Possible Cause	Customer Remedy	Service Remedy
Control results memory, Error 51, or sample results memory, Error 52, is almost full. Memory storage is nearly at 200 control result sets or 500 patient results sets and is not transferring to a computer.	Check that your computer is turned on, that the interface cable is securely connected at both ends, and that the setup parameters for the computer interface are correct. Transfer at least some of the record. If you are unable to transfer records, print the records and then delete the results from memory. Contact your local technical support provider or distributor.	Verify that customer setup is correct. Verify that External Computer Port is on. Verify that an external computer is connected to the RS 232 serial communication port or Ethernet port. Possible defective MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31. Possible defective MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Errors 53 and 54

Possible Cause	Customer Remedy	Service Remedy
Control results memory, Error 53, or sample results memory, Error 54, is completely full. Memory storage is at 200 control result sets or 500 patient results sets and is not transferring to a computer.	Check that your computer is turned on, that the interface cable is securely connected at both ends, and that the setup parameters for the computer interface are correct. Transfer at least some of the record. If unable to transfer records, print the records and then delete the results from memory. Contact your local technical support provider or distributor.	Verify that customer setup is correct. Verify that External Computer Port is on. Verify that external computer is connected to the RS 232 serial communication port or Ethernet port. Possible defective MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31. Possible defective MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Error 55

Possible Cause	Customer Remedy	Service Remedy
Both memory locations where Setup parameters are stored are corrupt.	1. Print a setup report to review defaults. 2. Compare the printed setup report to a previous stored or printed setup report and reset all of the options back to previous settings.	Reset MOTHER PCB and reprogram the software. Possible defective MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Error 56 – n

Possible Cause	Customer Remedy	Service Remedy
Analyzer error	1. Turn the analyzer power off. 2. Wait several seconds then turn it back on. If the error repeats, contact your local technical support provider or distributor.	General error code for internal communications errors. Possible defective MOTHER PCB. Refer to *Replacing the MOTHER PCB*, page 4-31. Possible defective MAIN PCB. Refer to *Replacing the MAIN PCB*, page 4-14.

Appendix A: Safety Instructions

This information summarizes the established guidelines for handling laboratory biohazards. This summary is based on the guidelines developed by the Centers for Disease Control, the Clinical and Laboratory Standards Institute Document M29-A3, *Protection of Laboratory Workers from Occupationally Acquired Infections*, and the Occupational Safety and Health Administration's Bloodborne Pathogens Standard.[1–3]

Protecting Yourself from Biohazards

Use this summary for general information only. It is not intended to replace or supplement your laboratory or hospital biohazard control procedures.

By definition, a biohazardous condition is a situation involving infectious agents biological in nature, such as the hepatitis B virus, the human immunodeficiency virus, and the tuberculosis bacterium. These infectious agents may be present in human blood and blood products and in other body fluids.

The following are the major sources of contamination when handling potentially infectious agents:

- needlesticks
- hand-to-mouth contact
- hand-to-eye contact
- direct contact with superficial cuts, open wounds, and other skin conditions that may permit absorption into subcutaneous skin layers
- splashes or aerosol contact with skin and eyes

To prevent accidental contamination in a clinical laboratory, strictly adhere to the following procedures:

- Wear gloves while servicing parts of the analyzer that have contact with body fluids such as serum, plasma, urine, or whole blood.
- Wash your hands before going from a contaminated area to a noncontaminated area, or when you remove or change gloves.
- Perform procedures carefully to minimize aerosol formation.
- Wear facial protection when splatter or aerosol formation are possible.
- Wear personal protective equipment such as safety glasses, gloves, lab coats or aprons when working with possible biohazard contaminants.
- Keep your hands away from your face.

- Cover all superficial cuts and wounds before starting any work.
- Dispose of contaminated materials according to your laboratory's biohazard control procedures.
- Keep your work area disinfected.
- Disinfect tools and other items that have been near any part of the analyzer sample path or waste area with 10% v/v bleach.
- Do not eat, drink, smoke, or apply cosmetics or contact lenses while in the laboratory.
- Do not mouth pipet any liquid, including water.
- Do not place tools or any other items in your mouth.
- Do not use the biohazard sink for personal cleaning such as rinsing coffee cups or washing hands.

To prevent needlestick injuries, needles should not be recapped, purposely bent, cut, broken, removed from disposable syringes, or otherwise manipulated by hand.

References

1. Centers for Disease Control. 1988. Update: Universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus and other bloodborne pathogens in healthcare settings. MMWR, 37:377–382, 387, 388.
2. Clinical and Laboratory Standards Institute (formerly NCCLS). *Protection of Laboratory Workers from Occupationally Acquired Infections; Approved Guideline - Third Edition.* CLSI Document M29-A3.[ISBN 1-56238-567-4]. Clinical and Laboratory Standards Institute, 940 West Valley Road, Suite 1400, Wayne, Pennsylvania 19087-1898 USA, 2005).
3. Federal Occupational Safety and Health Administration. Bloodborne Pathogens Standard. 29 CFR 1910. 1030.

Protecting Yourself from Hand-held Barcode Scanner

Clinitek Advantus Operator's Guide procedures that use the hand-held barcode scanner are introduced with the following laser warning:

LASER WARNING: Never look directly at the beam of a hand-held barcode scanner or point the scanner at another person. Also, do not look at the reflection of the beam from a shiny surface. Only trained field service personnel should perform procedures related to laser assemblies. Refer to Appendix A, Federal Occupational Safety and Health Administration. Bloodborne Pathogens Standard. 29 CFR 1910. 1030.

Appendix B: General Specifications

This section provides the following specifications about the analyzer:

- analyzer dimensions
- environmental specifications
- electrical requirements

Analyzer Dimensions

Dimension	Value
Depth	35 cm (13.75 in)
Height	32 cm (12.75 in)
Width	39 cm (15.75 in)
Weight	7.2 kg (16 lbs)

Environmental Specifications

Specification	Value
Ambient Operating Temperature	18°C to 30°C (64°F to 86°F) At temperatures under 22°C (72°F), urobilinogen and leukocyte results may be decreased, and at temperatures above 26°C (79°F), increased.
Optimum Operating Temperature	22°C to 26°C (72°F to 79°F)
Ambient Operating Humidity Range	20% to 80%, non-condensing, actively controlled (service: 85%)
Optimum Relative Humidity	35% to 55%
Indoor Use Only	
Altitude	up to 2000 meters
Ventilation	1709 BTU
Thermal Output	246 BTU/hr
IEC 1010-1 Installation Category II	
IEC 1010-1 Equipment Classification Class I	
IEC 1010-1 Pollution Degree 2	

Electrical Requirements

Requirement	Value
Electrical Rating	Auto Ranging 100 to 240 VAC ± 10%
Power Requirements	50 to 60 Hz
Maximum Power Input	72 VA
Fuse Rating	2 A, 250 V, 2 AG, SB(T)
Line Leakage Current	<0.5 mA in normal condition
	<3.5 mA in single fault condition
Testing protocol and allowable limits as specified by the safety standards for laboratory equipment outlined in UL 3101-1, CSA 22.2 No. 1010.1, and IEC 1010-1	

Appendix C: Supplies

Hard Standards Maintenance

The servicing of the Clinitek Advantus analyzer requires the use of Hard Standard Strips which are obtained in bottles of 5, under the part number 95002262, from the service inventory. These strips are designed to be in use for not more than 30 days then discarded. Calibration is not required. Unused strips have an indefinite shelf life as long as they remain in their original packaging and are not exposed to excessive moisture or light.

Storage

Unused Hard Standard Test Strips

Store new, unused Hard Standard Strips in the original labeled container. Protect them from excessive moisture and light.

Hard Standard Strips in use

When you remove a Hard Standard Strip from its original labeled container for testing of Clinitek Advantus analyzers, mark the date removed and put into service on the handle end of the strip. During its 30-day use period, segregate it from the unused test strips. Protect the container from air born contamination and direct light. You can use a clean, empty multistix black plastic bottle for this storage.

Use of the Test Strip

The test strips have a use life of 30 days. If in that period a strip starts failing analyzers, use a new strip as a confirmatory test. If the analyzer passes with the new strip, it is likely that the older test strip is damaged. Discard damaged strips.

Each day a test strip is used, examine it for signs of damage and dirt. Replace the strip if any damage or dirt is found.

Log sheet of use

Keep a log for the use of the test strips. An example of a suitable Log is below:

Start date of strip	Strip ID number	Checked for physical damage and dirt